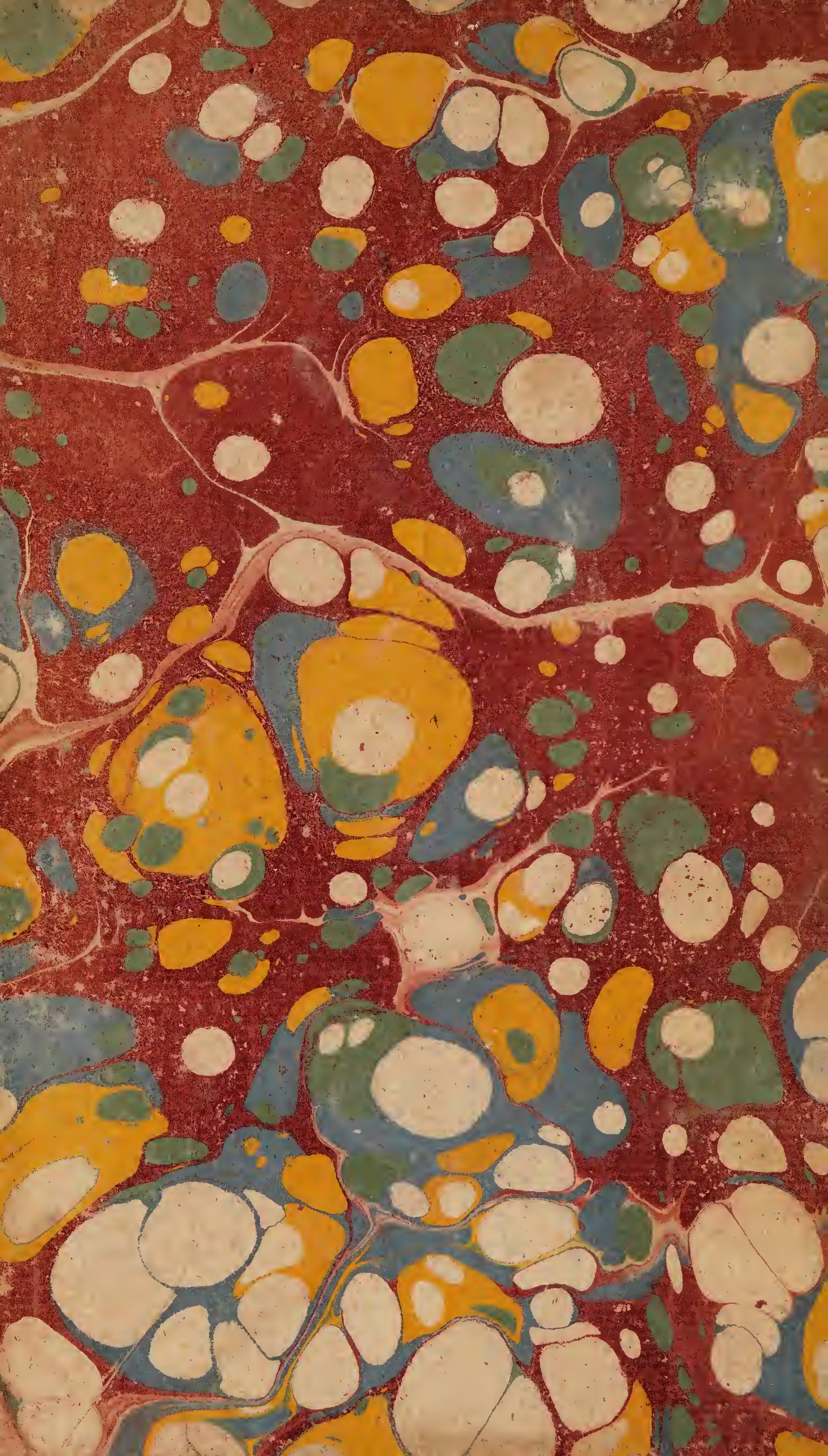

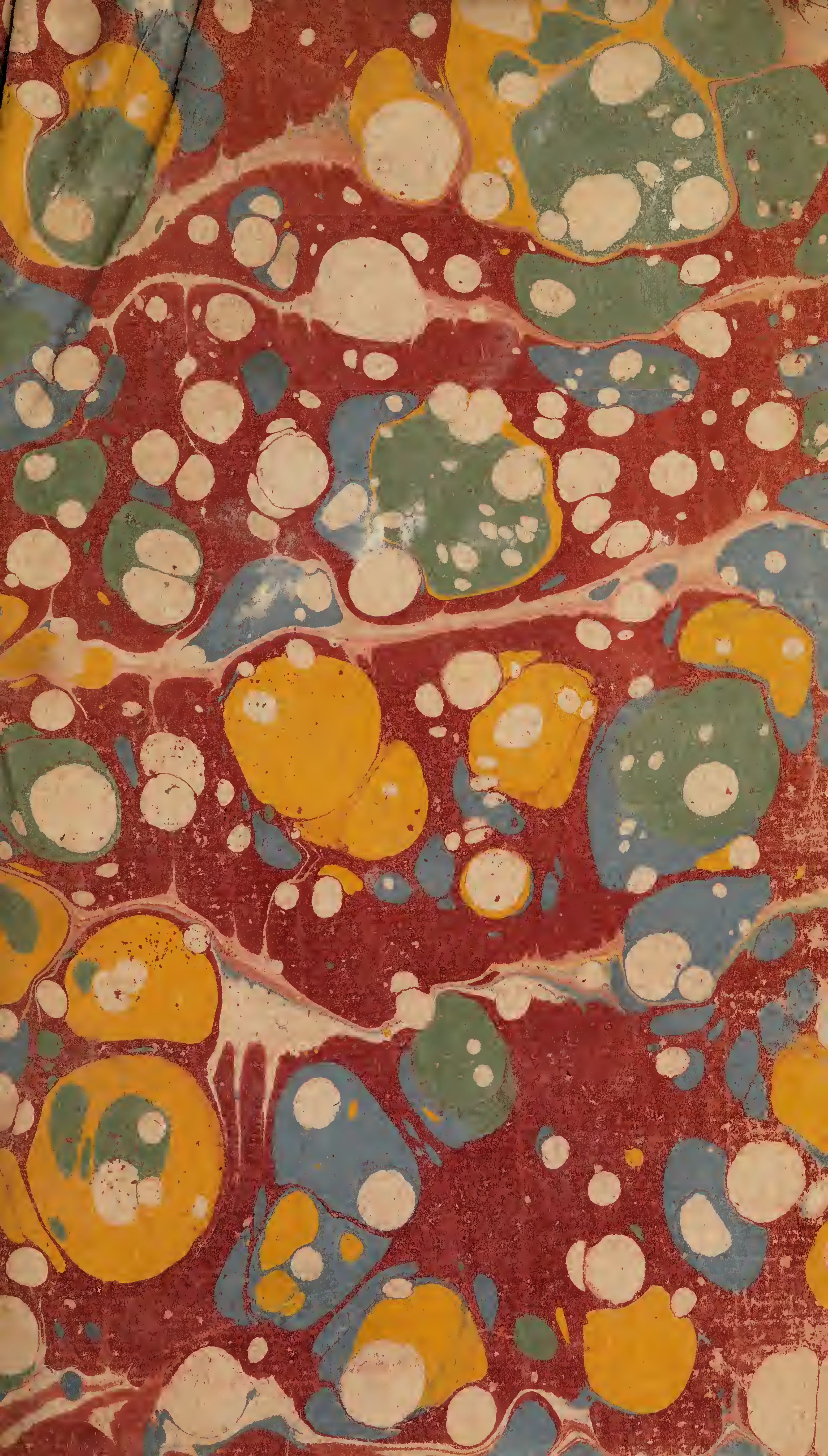

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THE
DOCTRINE
OF
INFLAMMATIONS

Founded upon Reaſon and Experience;

AND

Intirely cleared from the contradictory
Syſtems of

BOERHAAVE, VAN SWIETEN, and Others.

By DANIEL MAGENISE, M. D.

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T O

Sir *Clifton Wintringham*,

Fellow of the College of Phyſicians in
London, and of the Royal Society, and
Phyſician in Ordinary to his Majeſty,
the King of *Great Britain*, &c. &c. &c.

S I R,

THE ſkill and judgment, by which you adorn both your profeſſion, and the honourable office you hold from his Majeſty, with the humanity, diſintereſted behaviour, and thoſe other qualifications, which made you ſo valuable to the Nation, both at home and abroad, have induced me to beſpeak your patronage for this work, after its being laid aſide for many years, in which ſtate it might, perhaps, have ſtill continued, had not your eye at length given it new light, and myſelf a juſtifiable courage to offer it to the public peruſal. I have, therefore, taken the liberty to prefix your name to it, that being, through your approbation, preſented to the learned world, it may engage the candid part of it after your example, to receive favourably what it finds uſeful in it, and paſs over humanely the ſlips and errors which have eſcaped him, who, with great pleaſure, embraces this opportunity to acknowledge himſelf to be,

SIR,

Your moſt obliged humble Servant,

DANIEL MAGENISE.

PREFACE.

NO diſorder is more common, or attended with greater danger than an inflammation; yet in the beſt phyſical Authors, we find its cauſes and effects, not only confuſed, but even involved in manifeſt contradictions.

As an inflammation is the principal ſource of moſt diſorders, it is eaſy to perceive, how difficult it is, to give a compleat treatiſe of it; and that it is impoſſible in the narrow limits appointed for this eſſay to deſcribe the various forms it aſſumes in the different parts of the human body; I ſhall, therefore, only enquire into its general cauſes; and for the better accompliſhment of my deſign, and to enable the Reader to judge, whether the doctrine of inflammations receives any amendment from what is advanced in this treatiſe, I ſhall compare it with the opinions of ſome eminent Phyſicians, whoſe theory and practice are at preſent univerſally defended in the Schools, both of Phyſic and Surgery.

It is much more difficult to diſcover the cauſes of diſorders, than to preſcribe for their cure; and it is by his ſkill and ſagacity in making ſuch diſcoveries, that a

Phyſician ſhews how much he is above the level of Mountebanks and Pretenders.

As it is impoſſible to have experienced Phyſicians always at hand, where inflammations may happen, my deſign in this work, is, to the beſt of my abilities, to clear up what regards the efficient cauſes of this diſorder, for the benefit of the younger and leſs experienced Practitioners.

From the Authors publiſhed hitherto, I can quote no authority to ſupport what I advance concerning inflammations: therefore, to prove it, I am obliged to draw arguments from the very eſſence or nature of the diſorder; and although theſe may labour under the danger of novelty, yet I have ventured to publiſh them ſuch as they are, with a view to fix the theory and practice of inflammatory diſorders upon experience and rational principles. It may appear a preſumption to deviate from the beaten path; yet, as a member of Society, my duty in ſome meaſure engaged me to make this trial; and if I cannot ſucceed in my endeavours, it may, perhaps, excite the emulation of the learned to accompliſh it hereafter.

PREFACE.

I AM to give the Reader, without the help of any ſyſtem or hypotheſis, a clear idea of the various effects of an inflammation; point out how they are produced by the ſimple laws of nature, and prove my aſſertions by ſuch familiar examples, as daily occur in the practice of phyſic, and in the common actions of life.

LEAST the Reader ſhould loſe any time in forming difficulties againſt my doctrine, I have laid before him the principal objections that may be made againſt it with their anſwers.

THIS work being chiefly deſigned for the Gentlemen of the Faculty, who are all ſuppoſed to underſtand Latin, I thought it needleſs to inſert the Engliſh of my quotations, as it would only ſwell the volume unneceſſarily. And any curious Perſon, who may chuſe to amuſe himſelf with phyſical enquiries, can be at no great loſs, though he were no proficient in Latin; becauſe the remarks on every quotation, include whatever regards the doctrine of inflammations.

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THE DOCTRINE OF INFLAMMATIONS.

CHAP. I.

Of INFLAMMATIONS.

SECT. I.

Of a PHLEGMON.

BOERHAAVE takes the definition of an inflammation or phelgmon from its cauſes. Fernellius in imitation of all the Antients defines it by its effects, and allows the blood to be its proximate cauſe. This Author was the firſt of the Moderns, who collected from the Latin, Greek and Arabian Authors what he obſerved to be true and ſolid, and ſuch as by convincing arguments proved to be uſeful in the practice of phyſic. He was ſo impartial in adopting their doctrine, that without favouring one more than the other, he omitted nothing of what he found requiſite for the perfection of that ſcience.

Most authors adorn their works with the authority of the Antients, Boerhaave and Van Swieten generally quote for that purpoſe, Galen, Celſus, or Ægineta. Fernellius in every principal point agrees with the three laſt-mentioned Authors; he is alſo clearer, more methodical, and throws more light on every ſubject than any of them; for which reaſon, I deſign to illuſtrate the beginning of every principle article of this treatiſe, with an extract of what he has collected from the antients concerning an inflammation and its various effects. It will, without doubt, be agreeable to the reader, as it is the moſt exact ſpecimen of the kind, tranſmitted to us on that ſubject. I ſhall afterwards propoſe the principles of my own doctrine, and compare them with the ſyſtems of Boerhaave and Van Swieten.

Phlegmone tumor eſt calidus præternaturam collectus, prominens atque circum ſcriptus, ovi ſaltem gallinacei magnitudine. Huic quaſi ex igne aut ex balneo rubor ineſt: calor quoque ex inflammatione vehemens quaſi pars uratur: diſtenſio ex copia renitens: pulſatio profunda & moleſta, quod arteriarum diaſtole partem inflammatam feriat: dolor ex calore, ex pulſu atque tenſione acerbus, præſertim quum pars eximio ſenſu predita eſt. Cauſa continens ſanguis eſt, non in ſolam cutem, ſed in

ſubjectam quoque carnem impactus, qui e venis eo tandem confluxit. Quum enim venæ arteriæque majores immoderata ſanguinis copia diſtenduntur, hanc gravatæ in minores quaſi onus deponunt, ex his demum in minimas. Ac tum per earum oſcula perque tunicarum meatus ſanguis cohiberi non potis, effluit illabiturque in ſpatia vacua quæ inter fibras ſunt primorum corporum, præcipueque muſculorum, venarum, arteriarum, nervorum atque membranarum. Hæ partes fluxione dum perfunduntur implenturque, diſtentæ copia quaſi divelluntur, ferventiſque ſanguinis ardore incaleſcunt, doloremque faciunt. Sanguis quippe extra vaſa collectus, nec libere perflabilis, neceſſario putreſcit atque inflammatur. Ita quidem ſi purus is erat, ex quiſita phlegmone fit, cujus ſpecies ſunt: opthalmia, parotis, angina, parulis in gingivis, aliaeque ex

partibus nomina adeptae. Eſt & alia minus exquiſita, cujus non ſincerus eſt ſanguinis, ſed aliorum quoque humorum particeps. Hinc fiunt phlegmone eryſipelatodes et ſchirrodes. FERNEL. *de Extern. Corp. Affect.* pag. 608.

Φ. 1. A HOT ſwelling preternaturally collected, whereof the blood is the proximate cauſe, ſuppoſes a derivation of this fluid to the affected part. This was the opinion of all the Antients; it is the ſource from which Dr. Sauvage, Profeſſor of Phyſic in the Univerſity of Montpelier, has taken his ſyſtem; for he maintains that the encreaſed velocity of the fluids is the only proximate cauſe of an inflammation.

SOME of the antients compared an inflammation to a concentrated fire, and it is from thence, perhaps, Boerhaave took his attrition of the ſolids and fluids, which always ſuppoſes heat.

Φ. 2. FERNELLIUS diſtinguiſhes inflammatory ſwellings into tumours. tubercles and puſtules. A tubercle is leſs than a tumour, but larger than a puſtule. To theſe alſo he gives different names according to their appearances, and the parts they attack, whether glandular or fleſhy *. The largeſt tumour that appears in the ſkin or fleſhy part, he calls a phlegmon, which he ſays ſhould be as big as a hen's egg. Though the name of phlegmon is confined here, by our Author, to a particular tumour yet under that title, he gives us a general notion of inflammations according to the mode of the antients, and in another part of his pathology, we read, *Ipſa denique in-*

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* Vide, pag. 608. Pathologiæ.

ſlammatio quam proprie phlegmonem appellamus[*].

Φ. 3. Pain is the firſt effect of an inflammation, although our author ſays that it ariſes from the heat, pulſation and diſtenſion, which attend that diſorder. It is true, that as theſe are violent ſituations of the ſolids and fluids, they bring on an additional irritation, whereby the primitive pain is augmented; ſo that this ſaying of Virgil may be very well adapted to pain.

——Malum quo non aliud velocius ullum,
Mobilitate viget vireſque acquirit eundo.

Φ. 4. A Phlegmon takes different names from the parts it affects; if it attacks the eye, it is called an opthalmy; if the brain, a phrenzy; if the throat, a quinſey; if the pleura,

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[*] Vide, pag. 379. Pathologiæ.

pleura, a pleuriſy; if the lungs, a peripneumony, &c.

Φ. 5. Our Author mentions three ſorts of veſſels through which the blood is to paſs before it works its way into the cellular membrane to form a tumour; and that when it gets into this membrane, it produces the ſymptoms which attend ſuppuration.

Φ. 6. A Phlegmon by the antients and moderns is called eryſipelatous, if the ſwelling is ſuppoſed to contain a bilious fluid; œdematous, if a watery humour; and ſchirrous, if an indurated atribiliary matter*. †. The inaccuracy of this diſtinction will be diſcuſſed in Sect. 2. and Sect. 3.

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* Traité des tumeurs par M. Aſtruc, Medecin de S. M. T. C.

† Chirurgie complete des modernes, par M. Le Clerc. Medecin de S. M. T. C.

Φ. 7. INFLAMMATIONS or any other diſorders become known by their names, effects, or cauſes; by the very name of a phlegmon every one underſtands an inflammatory tumour. The effects which characteriſe it, are a ſwelling with redneſs, heat and pain; they are all enumerated by Fernellius; but as they ſuppoſe ſome cauſe, they can ſupply the mind with no curative indication. The effects of a diſorder may lead an experienced Phyſician to the knowledge of its cauſe; but as there is a real diſtinction between the cauſe and effects, the indication taken from the former, cannot be ſuppoſed to proceed from the latter. From whence we may judge, that the knowledge which reſults from the names and effects of diſeaſes, is very defective; and conſequently the indications which can be drawn from thence muſt be equally ſo; and that thoſe who fix their practice upon ſo uncertain a foundation, muſt be liable to many dangerous errors; for giving no attention to the fundamental principles of phyſic, nor to the ſympathy which ſubſiſts between the different parts of the human body, they never heſitate to preſcribe cephalics, for example, for every diſorder of the head, although they generally proceed from an indiſpoſition of the ſtomach charged, as it often happens, with a ſaburra. But if thoſe people knew how to trace out the original cauſes, they would preſcribe evacuants inſtead of cephalics, and would be thus enabled to give the patient (at the ſame time) a true prognoſtic concerning his cure.

As the practice of the Antients with regard to a phlegmon, could have been founded upon nothing elſe but the effects enumerated by

Fernellius, we can eaſily judge how obſcure and intricate it muſt have been. What I have extracted from this Author, is a compendium of what he found moſt ſelect in the writings of the antients concerning the preſent ſubject.

Now by the method I have purpoſed to follow, I am engaged to enquire into the opinions of our own cotemporary Phyſicians; but in order to accompliſh my deſign, it would be an endleſs work to cite what was ſaid on that ſubject by each of them in particular; for which reaſon, I have ſelected Boerhaave, whoſe doctrine concerning inflammations is univerſally adopted by the Phyſicians and Surgeons of the preſent age. That the doctrine of ſo great a man ſhould be called in queſtion, by a perſon whoſe name is quite unknown to the learned, will appear to moſt people to be too bold an undertaking; and the more ſo, as it has been ſo much illuſtrated by the celebrated Van Swieten, that it cannot be contradicted by any Phyſician, let him be ever ſo learned, without endangering his reputation. Notwithſtanding theſe diſcouragements, the deſire of being ſerviceable to mankind, and particularly to young Phyſicians and Surgeons, engaged me to examine it ſtill farther, and to try to fix it upon evident principles; for nothing can diſhearten ſtudents more in the purſuit of learning, than to find the baſis of their art founded upon obſcurity and contradictions. They muſt certainly be well pleaſed to be cautioned againſt the three fountains of error, which I have diſcovered in the doctrine of Boerhaave, for if they were not forewarned, they might unwarily fall into them, and that by ſo much the oftner, as every diſorder, though not inflammatory, ſhould nevertheleſs be compared with inflammations by young practitioners, both in phyſic and ſurgery. For we are to obſerve, that in health the circulation is ſedate and uniform, and that when it is augmented above this ſtandard, there is an inflammation or a diſpoſition towards it; and that when it is below it, there is a debility or want of motion, from whence proceed various diſeaſes, which may be more eaſily known and cured, by comparing their cauſes and effects with thoſe of health, and thoſe of inflammatory diſorders; for by acquiring a true knowledge of the effects of the latter in the doctrine of inflammations, and alſo of the medicines whereby they are removed or prevented, no one in the leaſt converſant in the materia medica, can be at a loſs to relieve the complaints ariſing from the former, by their oppoſite remedies. This method may be of ſome conſequence in practice; for I have heard many Profeſſors of phyſic, remark, that ſtudents moſt commonly acquired a knowledge of the ſymptoms, and cure of inflammatory diſorders ſooner, and with leſs ſtudy than of any other; they may, therefore, by obſerving this method, come to a more clear and certain knowledge of ſuch diſorders as proceed from debility or want of motion, than by any other method whatever; for it is by what we know beſt, and moſt clearly, that we can form clear ideas of what we know but obſcurely.

Boerhaave, for the ſimplicity of his method in tracing out and diſtinguiſhing diſorders by their cauſes, is deſervedly accounted by all people to be the light and ornament of modern Phyſicians. Mankind is under no leſs obligation to Van Swieten, his learned commentator; but it will appear from what follows, that they are both wrong in what regards the doctrine of inflammations.

THE firſt fountain of error I have diſcovered in their doctrine, ſprings from the different ſeries of veſſels, wherein they have both placed the different kinds of inflammation. The diverſity of humours which occaſion theſe different kinds, fill up the ſecond fountain; and the third ariſes from the different cauſes to which this diſeaſe is attributed.

BOERHAAVE divides the arteries into ſanguiferous, ſerous, and lymphatics, and ſays, that an inflammation always takes place in theſe arteries, becauſe the blood paſſes in them, as it were, from the baſe of a cone to its apex; and that it never attacks the veins, becauſe the courſe of their fluids is from the apex to the baſe, unleſs the circulation is ſtopped in them by compreſſion. He ſays alſo, that the ſerous arteries ariſe from the moſt minute ramifications of the ſanguiferous, and the lymphatic arteries from the moſt minute ſerous arteries; and that the ſerous arteries are ſmaller than the ſanguiferous, but larger than the lymphatic arteries, and that the blood is thicker than the ſerum, and the ſerum thicker than the lymph.

From theſe three ſorts of humours, and three different ſeries of veſſels, Boerhaave and Van Swieten, have deduced three different kinds of inflammation, as a phlegmon, an eryſipelas and an œdema. They call the firſt an inflammation of the firſt order,

der, and place it in the ſanguiferous or ſerous arteries; in the firſt caſe, they ſuppoſe it to be always red, but that in the latter, a ſufficient quantity of red blood does not at all times enter the ſerous veſſels to give it that colour.

BEFORE I enquire into theſe principles, order requires, that I ſhould mention the true cauſes of a phlegmon. To know diſorders by their effects, is to know them by what they are not, it is the ſame as to form an idea of a tree we never ſaw, by its fruit; but to know diſorders by their cauſes, is to know them by the prime attributes which conſtitute their nature or eſſence.

MOST diſeaſes draw their origin from three efficient cauſes. The firſt, which may be called external or evident, produces internally the antecedent cauſes that give birth to the proximate cauſe, ſo called, becauſe it exiſts in the body, and is immediately connected with the diſorder. Sometimes two efficient cauſes concur to produce an ailment, and ſometimes one only is ſufficient; as in a wound made with the point of a ſword. It is of the utmoſt conſequence in the practice of phyſick, to have the diſtinction of theſe cauſes preſent to the mind.

THE external cauſes of an inflammation are fractures, luxations, compreſſions, aromatic aliments, abounding with oil and ſulphur, paſſing ſuddenly from a warm into a cold place, and many other external applications which produce their effects, either ſuddenly or ſlowly. The irritation, irritability and ſenſibility of the fibres reſulting from thence, are the antecedent cauſes of this diſorder:

order: but it may be properly defined, according to its proximate and immediate cauſes, *an erethiſm of the veſſels, with the velocity of the fluids preternaturally encreaſed.*

THE nature and effects of an inflammation, with certain indications, may be clearly underſtood at firſt ſight of this definition, which will evidently appear, by comparing it with the following one of Boerhaave.

"371. Eſtque ſanguinis rubri arterioſi in minimis canalibus ſtagnantis preſſio & attritus a motu reliqui ſanguinis moti, & perfebrem fortius acti."

β. I. SEVERAL incoherencies occur in this definition of our celebrated Author; for he ſuppoſes a ſtagnation, an obſtruction, a preſſure, and an attrition of the ſame red arterial blood violently moved and agitated in an inflamed part; theſe are indeed oppoſites which can never ſubſiſt together in the ſame place; for the inflamed veſſels are obſtructed, or they are not; if they are obſtructed, the blood muſt ſtagnate in them, and remain without motion; on the contrary, if they are not obſtructed, an obſtruction ſhould not be accounted one of the cauſes of an inflammation, as it is aſſerted in the foregoing aphoriſm. Moreover, an obſtruction excludes all motion; for it is a ſtoppage of one or many veſſels, which hinders the diſtribution of the fluids in the part ſo affected; ſo that it is a gangrene in miniature, with this difference, that the obſtructed matter does not deſtroy the veſſels, ſo ſoon as the former; but every one believes, that a gangrene excludes the diſtribution of the fluids in the affected part; therefore it follows very plain, from the true notion we have here given of an obſtruction, that the ſame muſt happen wherever it takes place.

β. 2. It cannot be underſtood how the fluids can ſtagnate in the capillary veſſels of the human body. Water is ſaid to ſtagnate in a pool, becauſe it is confined there in a certain ſpace, from whence it cannot move backward, forward, or laterally; it has no other motion, but that of fluidity, that is, a facility which its particles have of ſlipping eaſily one over another; but if there were only a few drops of water in the pool, certainly they could have no motion of fluidity; they would remain immoveable in its bottom; therefore, in order they ſhould have their natural motion of fluidity, it is neceſſary there ſhould be a certain quantity of water placed under them, over them, before them, behind them, and laterally. Beſides the particles of water having little or no coheſion together, muſt certainly be more fluid than thoſe of the blood, eſpecially in a ſtate of ſtagnation.

From the nature of fluidity now explained, we can eaſily judge, that it is impoſſible a few particles of blood impacted and ſtopped in veſſels, whoſe diameters, according to Van Swieten, are not equal to the tenth part of that of a hair, could preſerve their fluidity. It will appear ſtill more impoſſible, if we conſider the coheſion and glutinous tenacity of the blood globules, which, joined with the heat excited in the capillaries by an inflammation, would ſoon render their ſtagnating fluids as hard as an extract. Hence we ſee, that a ſtagnation of the humours in the capillary veſſels, no leſs excludes motion than an obſtruction.

β. 3. OUR Author ſuppoſes the obſtructed or ſtagnated blood to be violently moved by attrition. Indeed, he might as well ſay, that the blood was at reſt, and violently moved at the ſame time, which are two contradictories.

HENCE it is evident, that the doctrine of inflammations, which may be reckoned the baſis of phyſic and ſurgery, has been founded hitherto upon a contradiction, and received as a truth by moſt of the Phyſicians and Surgeons in Europe. This, among others, may be the reaſon, why ſome were not aſhamed to own that their art was founded upon uncertainties ſufficient of themſelves to diſcourage any one from inquiring into its principles.

For the future, it is to be hoped, that both phyſic and ſurgery will be freed from this aſperſion, by the rational and experimental principles, whereby, I am to account for the various effects of an inflammation.

Boerhaave and Van Swieten, often mention the red blood going into the veſſels of the eye, in order to prove, that an inflammation is occaſioned by a ſtagnation and an obſtruction; but this example proves nothing in favour of their aſſertion; for any one, who attends to the works of nature, may eaſily ſee that there was ſomething prior to the redneſs of the eye, which occaſioned a greater column of fluid than uſual to come into its veſſels. Sometimes a ſympathy with ſome ailing part of the body, an air, a ſtinking effluvium, and very often a fluxion of ſome acrid humour may occaſion a redneſs in the eye; but theſe are only external or antecedent cauſes, which, by irritating and exciting an unuſal motion in the veſſels of the eye, occaſion ſo great a quantity of fluids to run into them, as to produce a redneſs; it cannot therefore be ſuppoſed, that an obſtruction or a ſtagnation in ſuch caſes, may be the proximate cauſe of the redneſs of the eye. Moreover, it cannot be conceived that the blood could ſtagnate in the veſſels of this organ for weeks, months, and ſometimes years, as we ſee in blear-eyed people; it is therefore probable, that the blood circulates all the time; otherwiſe it cannot be comprehended how the eye could recover its native colour, when the irritating cauſe is removed by the power of medicines. But of this, I ſhall ſpeak more at large, in Sect. 3.

Now as it is proved, that an obſtruction or a ſtagnation of the humours, cannot be reckoned a proximate cauſe of inflammations, I am to prove next, that it cannot be produced by the encreaſed velocity of fluids alone, which the celebrated Van Swieten, holds to be one of its proximate cauſes in his commentary on Aph. 371; and which, Dr. Sauvage maintains to be the only one; for it cannot be conceived how the velocity of the fluids can be encreaſed without the concurrence of other cauſes; even if it could, it cannot be underſtood how it could bring on an inflammation. Canals, and banks of rivers contribute nothing towards the rapidity of the currents; but we cannot infer from thence, that the like happens in the canals of the human body; for when they become any way inactive, as for example, in a dropſy, the Patient is ſoon deſtroyed, unleſs he gets ſpeedy relief from his Phyſicians. Where then can we trace out the cauſe of this velocity given by our Author to the fluids? We muſt not feign things we cannot ſee; for all the rivulets of ſyſtems, and hypotheſes are ſtopped at their ſource, ſince phyſic is defined an art and a ſcience, founded upon reaſon and experience, &c. therefore, we muſt ſeek for it in the *penetralia*, or inward receſſes of nature; but in order to ſucceed in our ſearch, we muſt give ſtrict attention to the different changes, which, upon every accident of life, happen in the human body; thus for inſtance, by the pricking of a thorn, or needle, by the ſtinging of Bees, Waſps, by fire, the venereal diſeaſe in gonorrhœas, &c. by each of theſe and ſuch like cauſes, are produced all the genuine effects of an inflammation,

mation, as pain, ſwelling, heat, redneſs, &c.

Now, no obſtruction or ſtagnation of humours, can be ſuppoſed in the affected parts; therefore, the effects of an inflammation, may proceed at leaſt, occaſionally from a ſtimulus; I ſay, occaſionally, becauſe a ſtimulus could produce none of the foregoing effects in the veſſels of the human body, if they were not ſenſible and irritable.

An irritation and its effects are greater or ſmaller, according to the force of the ſtimulus, and ſenſibility of the affected part. That mode of action, which reſults from the ſenſibility and irritation of the veſſels, I call an erethiſm, this action is neither periſtaltic, nor oſcillatory; it is different in the ſmall-pox, the meaſles, the itch, &c. it varies according to the ſtimulus; ſo that there are as many kinds of it, as there are ſtimuli in *rerum* natura; becauſe different ſtimuli make different impreſſions, that excite the veſſels to ſo many different kinds of erethiſm, which are attended with as many different diſagreeable ſenſations.

From the foregoing examples of the pricking of a thorn, of a needle, ſtinging of Bees, &c. it is evident, that whenever an erethiſm is excited in the veſſels of any part, an encreaſed velocity of the fluids muſt neceſſarily follow in that part, and that by taking away theſe two cauſes, we take away the inflammation. This will appear more clearly, by what I am to ſay, in the ſequel of this ſection, concerning heat, a tumour, and the other effects of an inflammation.

THE chief effects of an inflammation are heat, pain, a ſwelling, redneſs, and the acceleration of the pulſe, which I am now to explain one after another.

ß. 4. ACCORDING to Boerhaave's doctrine, the production of heat in the inflamed capillary veſſels, cannot be accounted for; for it conſiſts in the reciprocal action, and re-action of the ſolids and fluids, which is manifeſted in running Footmen, working People, &c. but the fluids are at reſt and obſtructed in theſe veſſels, according to the hypotheſis of our Author, and heat is always diminiſhed in ſuch as have obſtructions, as we know by a very obſervable caſe in a young Woman labouring under a chloroſis; and, therefore the production of heat in an inflamed part, cannot be accounted for, if we admit the definition which Boerhaave gives of an inflammation, in Aph. 371.

§. 1. SOME may object, from what is ſaid in this paragraph, that Boerhaave attributes a greater velocity to the fluids contained in the veſſels of the inflamed part which are not obſtructed.

THESE unobſtructed veſſels are inflamed, or they are not; if they are inflamed, our Author has no reaſon to aſſert, that an inflammation has for its cauſe, an obſtruction of theſe veſſels; if they are not inflamed, the objection is not againſt us.

THAT the various effects of an inflammation, and what I am to prove in the ſequel of this work, may be eaſily underſtood, I find it neceſſary to premiſe a phyſiological explication of the mechaniſm of animal heat;

and for that end, I ſhall firſt explain the two-fold motion of the blood in the veſſels of a living body; for every minute drop or particle of it moves round its axis, and advances with a progreſſive motion, from the heart to the extremities of the body, and back again.

LET us firſt, in imitation of all Authors, call the minute drops of our humours, globules, and let us imagine, a tube preſſed on all ſides, containing an infinite number of theſe globules, all unequal, infinitely ſmall, and moved according to all directions. 2. Let us ſuppoſe, the humours of a human body, during their actual ſtate of fluidity, to be capable of ſuch motions as Sir Iſaac Newton has proved all fluids are ſuſceptible of. 3. All Authors allow the whole maſs of our humours, to conſiſt of globules of different ſizes and denſities, as the blood, for example, the ſerum, the lymph, &c. 4. Let us ſuppoſe the fluids in any veſſel of the human body preſſed by the ſkin, the muſcles, the external air, and by the other contiguous veſſels.

From theſe premiſes may be eaſily underſtood, that every globule of that fluid muſt receive impulſes from the ſkin, the muſcles and the lateral tubes, its very weight and elaſticity, from anterior, poſterior, and lateral globules, and laſtly, from the different ſituations and motions of the body; therefore, it receives ſhocks or impulſes, according to innumerable directions; but, by the laws of mechanics, when a body receives impulſes in that manner, it ſhould yield to them all, as much as poſſible, and be moved according to their different directions; therefore,

fore, as every globule of blood receives impulſes in every point, it ſhould yield to them all, and of conſequence move round its axis, as long as it receives them after the manner here deſcribed; but it receives them thus whilſt the heart moves; therefore, every globule of our humours moves round its axis, at leaſt, in the large veſſels, until the motion of the heart ceaſes. This motion of the fluids round their axis, by the ſuperior force of the heart impelling the poſterior globules, becomes progreſſive; for it is a law in mechanics, that when a body receives impulſes from different powers, according to different directions, it ſhould move with a progreſſive motion, according to the direction of the ſtrongeſt; but of all the the powers acting in the blood veſſels, the impulſe of the heart, communicated to the poſterior globules, is the ſtrongeſt; therefore, all the globules contained in the veſſels of the human body, ſhould be moved according to the direction of the heart, with a progreſſive motion; the ſame may be ſaid of the other humours, as they are equally ſubject to the ſame laws of motion.

We are indeed to remark here, that it cannot be conceived how the globules of our humours can move round their axis in the capillaries, where only one globule can enter at a time, by every ſuction and attraction, which is the only way the circulation can be carried on in theſe veſſels; becauſe they have no perceptible ſyſtole nor diaſtole. We allow the propelling force of the heart behind to concur, in as much as it conveys the fluids to their orifices.

It may be eaſily concluded from what is ſaid, concerning the two different motions of the blood, that the heat of the human body conſiſts in the repeated action, and re-action of the ſolids and fluids, and as theſe are augmented in an inflammation, the exceſs of heat in this diſorder may be eaſily accounted for, according to our doctrine; for the velocity of the fluids being preternaturally encreaſed, (which we hold to be one of the proximate cauſes of that diſeaſe) the contraction of the heart muſt at the ſame time be more frequent and ſtrong, and conſequently the action and re-action of the fluids and ſolids, augmented accordingly, and produce heat. On the other hand, it cannot be denied, but all living creatures have an inſtinct which excites them to uſe the utmoſt of their power to remove the cauſe of pain; for the firſt law of nature is to ſeek food to preſerve life, and the ſecond to avoid, as much as poſſible, any thing which might deſtroy it; and indeed we find, that the heart obſerves this ſecond law inviolably upon all accidents.

It is by this inſtinct or ſympathy, that when any part is irritated, the heart directs to it immediately a quantity of fluid proportionable to its irritation, by which its veſſels are dilated and contracted with greater force; and conſequently their tabulæ or ſides muſt approach one another, and repel the fluids which rally in their turn, and thus ſucceſſively their motion round their axis, with their progreſſive motion, is accelerated, and becomes more rapid in proportion, as the blood abounds with oil and a ſulphureous principle, or other elaſtic particles which are eaſily put in motion and warmed. The heat ariſing from ſuch blood is ſoon diffuſed from the heart, as the center of motion, through the veſſels to the circumference of the body, in the manner of rays, *quaſi per irradiationem.*

The force, by which the erethiſm impels the fluids againſt the ſides of the veſſels, is, as it were, a proportional medium between their irritation and contraction. As that force is various, according to the variety of the ſtimulus, and to the addition it receives ſucceſſively from the preternatural velocity, elaſticity and quality of the blood, it produces alſo various degrees of contraction in the veſſels, and conſequently various degrees of heat. From hence, and from the notion I have given of an erethiſm, (page 28) it may be eaſily underſtood, why one degree of contraction brings on a ſmall inflammation, another a great one, a third ſuppreſſes the excretions, as it happens in an ardent fever ; how, by another degree ſome excretions are encreaſed, as when ſweat or ſpitting is brought on by a ſlow erethiſm, in ſome hypocondriac habits; and laſtly, how the contraction may ſometimes be ſo violent as to cauſe convulſions.

No Artiſt was ever found ingenious enough to contrive a machine, which could perfectly repreſent the circulation of the blood in a living animal ; yet, Phyſiologiſts are allowed to uſe ſuch evident examples as they are ſupplied with from experimental philoſophy, in order to clear up ſome caſes, which are not immediately obvious to the ſenſes; I ſhall for that reaſon, make uſe of the following experiment, that it may help to render my phyſiological account of heat more intelligible; and that the conſequences and corrollaries deduced from thence, may be more eaſily comprehended.

LET glaſs reduced to powder, water and oil be agitated with a vehement motion in a glaſs veſſel, the particles of glaſs being the heavieſt and moſt denſe, advance with a progreſſive motion to the circumference of the veſſel, leaving the oil and water behind at the axis and center; but the contrary happens, when the motion is leſs vehement.

LET the center of the glaſs veſſel repreſent the heart; its circumference that of the human body, and the different ſubſtances it contains the different humours of a living animal; and allowing the circulation to be carried on by the like mechaniſm, the blood being heavier and more condenſed than the ſerum and lymph, will leave them both behind, when by a vehement motion, excited by an erethiſm, they are propelled all together to the inflamed part, where the blood produces irritations in proportion to the different contractions of the vaſcular ſyſtem. It may be inferred from thence, that in every degree of inflammation, a greater quantity of red blood than any other humour muſt come to the affected part; and that it cannot be conceived, how an eryſipelas and a hot œdema, can be formed by any humour different from the red blood, as Boerhaave and Van Swieten aſſert, in Aph. 380.

Let it not be imagined, that this concluſion is merely hypothetical, and entirely founded upon the forementioned experiment; for we may ſee the truth of it proved by almoſt every accident which happens to the human body, as I have conſtantly obſerved for many years paſt, by attending diligently to the changes which follow, when it is either hurt or irritated by external cauſes; upon all ſuch occaſions, a redneſs enſues ſimilar to that which ariſes by running, dancing, ſinging, or on uſing any other violent exerciſe, or on the prick of a thorn, the ſting of a Bee, a ſtroke, &c; ſo that every ſuch accident of life proves, that a greater quantity of blood is determined to an inflamed part, than any other humour. We may alſo learn from the ſame principles, why, in an ardent fever, and in all inflammatory diſorders, the blood propelled more frequently to the circumference of the body, ſhould there preſs the origin of the ſerous and lymphatic veſſels, and occaſion an exſiccation of the ſkin. On the contrary, when the motion of the fluids is in a natural ſtate, the ſerum, lymph, and the humour of inſenſible perſpiration, leave the blood behind, and come in a greater quantity towards the ſkin; from whence its whiteneſs, ſoftneſs, and humidity muſt neceſſarily proceed.

Some Authors maintain, that the ſubtil matter of our atmoſphere, is the chief agent which carries on the circulation of the animal fluids, produces heat, muſcular motion, &c. Although, what can be ſaid on this ſubject, borders too much on hypotheſis, to deſerve a place in a work, whoſe object is the preſervation of life, by rules founded on facts; it may not, however, be improper to entertain the Reader a few moments with my opinion, and compare it with that of ſome eminent Authors, who have moſt ſeriouſly conſidered it.

Many Phyſiologiſts ſuppoſe the different kinds of matter which float in our atmoſphere, and which eſcape our ſight, to enter into the blood, and render it more ſtimulating, and of conſequence, more apt to ſollicit the contractions of the veſſels, and produce heat. Among the reſt, Bergerus in his Phyſiology, ſuppoſes the blood to become more elaſtic, and to be more eaſily moved by being mixed with the air, and with the ſubtil matter which are expanded in the atmoſphere. Dr. Whytt, Profeſſor of Phyſic in the Univerſity of Edinburgh, ſeems to ſuppoſe the ſame; for he enumerates the acid of our atmoſphere, among the cauſes of circulation, and the action of the muſcles, in his elegant treatiſe on animal motion. Some arguments now occur to me, for and againſt theſe ſyſtems.

The exiſtence of ſubtil matter in our atmoſphere, is proved by the experiments of electricity; by the encreaſed weight of antimony in the focus of a burning glaſs, and by the circulation of the magnetic effluvia, from the arctic, to the antarctic pole, of which Mariners no more doubt, than of the air's exiſtence in violent ſtorms. The exiſtence of an acid in our atmoſphere, has been proved by the honourable Robert Boyle, who, by expoſing to the air the different bodies, which have an affinity with particular acids, found that the atmoſphere of London abounded with the acid of ſulphur; and it is more than probable, that the atmoſphere of every country is impregnated with ſome kind of acid.

From theſe premiſes, we can reaſon thus; it is known by experience, that the human body placed in a watery atmoſphere, ſwells by abſorbing water; in like manner, mercurial ointment applied to the ſoles of the feet, aſcends to the ſalival glands. It cannot be denied, but the air, the acid of ſulphur, the magnetic and electric effluvia, are much more ſubtil than water or mercurial ointment; therefore, it may be analogically inferred, that theſe fluids circulate with the blood. If they do, the electric matter, by its nature, (for it is ſuppoſed by many to be the ſame as the matter of fire or light) the magnetic effluvia by attraction in the capillary veſſels, the air by its elaſticity, and the acid of ſulphur by its ſtimulus, muſt all concur to augment the action and re-action of the ſolids and fluids, and produce heat.

The froth of the blood coming out of the veſſels proves that it contains air, and the volume of air extracted from it in the receiver of the machina pneumatica is three times greater than its own. This ſeems to prove, that the air circulates with the blood; but it cannot be eaſily conceived how the ſides of the veſſels could reſiſt the force of the air, if it were condenſed to that degree, and could at the ſame time exert its elaſtic and expanding force; beſides the fluids are incompreſſible, or if they be not, as ſome ingenious Gentlemen have often attempted to prove, they muſt be compreſſible in ſo ſmall a degree, as not to admit air as elaſtic; for if it were elaſtic, its globules by attraction would unite, and in a ſhort time ſtop the circulation; moreover, it is proved, that an elaſtic air cannot penetrate capillary veſſels of glaſs; but the blood veſſels are much more minute, than capillary veſſels of glaſs; the air, therefore, cannot penetrate them without laying aſide its elaſtic property.

How can it therefore happen, that rheumatic pains and ſwellings are produced in all parts of the body, even in the ſtrongeſt and moſt robuſt habits, by wind or an expanſion of air, as ſome grave Gentlemen confidently aſſert?

Nothing that we know can ſtop the magnetic effluvia in its courſe from North to South; it cannot therefore be underſtood, how it can circulate with the blood; we have no better proof to convince us, that the electric effluvia or the matter of light, mix with the animal fluids.

From the chymical analyſis of bile, and that of urine, we know, that a ſulphureous principle is contained in the humours of the human body; for the ſmell of the ſalt extracted from the two former, proceeds from thence. But we have no proof, that this principle is abſorbed from the ambient air, neither have we any occaſion for ſuch a ſubterfuge; for our aliments ſupply it very copiouſly.

MR. BOYLE aſſerts, that among the different particles of matter, which float in the atmoſphere, there may be ſome ſo minute, ſo ſolid and ſhaped after ſuch a manner, that they may enter the orifices of the cuticular glands and the other pores. Hence may be underſtood, why the plague (of which Cardanus ſpeaks) that reigned at Baſil, ſpared the Italians, French and Germans. Boerhaave, in his chymiſtry, concludes from thence with our noble Author, that the pores of theſe People were ſo formed, that the peſtilential effluvium could not penetrate them, whereas it found an eaſy entrance into the Citizens and Natives, whoſe pores, by length of time were made to correſpond to the figure of the ſubtil particles of matter which floated in the atmoſphere, in the ſame manner as iron placed for a long time in the pinacles of churches, acquires magnetic properties.

From theſe premiſes, we may conclude, that neither the air, nor any other particles of matter expanded in the atmoſphere, can enter the blood without being ſo intimately combined therewith, as to aſſume its nature, and lay aſide in ſome manner ſome of their own properties. It is thus, ſal ammoniacum, when united with the mucous and gelatinous part of the blood, in a ſtate of health, is imperceptible.

Every Phyſician will grant, that the particles of matter which float in the atmoſphere, exiſt in all vegetables and animals, as elements; and it is in that ſenſe, I allow, that they contribute to produce heat in the human body. We are to remark, that the elementary particles which cauſe heat, are unequally diſtributed in vegetables even of the ſame ſpecies, according to the climate and ſoil which produce them; as we ſee manifeſted in wines of different countries and different ſoils: The like inequality may be conſtantly obſerved in the different claſſes of mankind, which, according to the goodneſs of their climates and aliments, are more or leſs ſubject to inflammatory diſorders, and the preter-natural effects which generally ariſe from too much ſtrength or heat in their conſtitutions.

β. 5. Now as we have proved, that an inflammatory heat cannot be accounted for according to Boerhaave's doctrine, it is not to be admired, that by the ſame principles, we cannot be enabled to explain, how a tumour can take place in the capillary veſſels of an inflamed part. For in that caſe, their diameters ought to be enlarged, a thing impoſſible, on account of an attrition of their fluids, which muſt cauſe their ſides to approach one another; and of conſequence leſſen their diameters, and rather diminiſh than augment their quantity of fluid, on account of the repeated contractions whereby an attrition is carried on. Beſides, our Author ſuppoſes an obſtruction in the inflamed capillaries, which, as we have ſaid above, excludes all motion; but a hot tumour cannot be ſormed in any part, without an exceſſive great motion of the fluids; therefore, an obſtruction, and the ſort of motion on which an attrition depends, rather hinder than bring on a tumour in an inflamed part.

§. 2. OUR adverſaries may object, that we can give no reaſon why the ſides of the veſſels ſhould come together in an attrition.

AN attrition, in what ever ſenſe it is taken, ariſes from the frequent contractions of the veſſels; but in contracting themſelves, their ſides muſt certainly approach one another; and their diameters of conſequence muſt be leſſened, and this muſt happen conſtantly ſo, from a ſtate of inanition to the moſt ſupreme degree of a plethora.

All Phyſicians know that a plethora ad vaſa often proceeds from an attrition of the fluids; for when this is carried on to a certain degree of intenſity, the humours are ſo triturated thereby, as to occaſion ſometimes a rarefaction, and an intire decompoſition of their component particles, as Practitioners may frequently obſerve in blood drawn from inflamed Patients.

When the attrition of the animal fluids languiſhes or is intirely wanting, the circulation of the blood, and the reſt of the functions languiſh alſo; as we ſee in a young Girl labouring under a chloroſis, or in ſuch as are cachectic, or weakened by chronic diſorders.

Indeed a ſwelling is not eſſential to an inflammation, as ſome Authors affirm; for the inteſtines are ſometimes

times converted by this diſorder into dry, thin, yellow or black membranes, which I ſaw often verified by opening bodies whoſe deaths were occaſioned by inflammations of the abdomen. And in ſcrophulous and venereal diſorders, there is ſometimes a ſlow erethiſm, with a preternatural velocity of the fluids without any apparent ſwelling.

§. 3. It may be objected againſt what I have ſaid in this paragraph, that in an inflammation, the veſſels are diſtended with a greater quantity of blood than in a natural ſtate; and that of conſequence a tumour muſt, in ſome ſenſe, be eſſential to that diſorder.

In many bodies who died of inflammations, I ſaw the inteſtines and lungs reduced to very ſmall bulks. I ſaw alſo the bodies of conſumptive and phthiſical People covered over with ulcers, without any appearance of a tumour; but ulcers do not come without a previous inflammation; therefore we can aſſert, that an erethiſm of the veſſels with an encreaſed velocity of the fluids, can exiſt in a part without a tumour; and that of conſequence, a ſwelling is not eſſential to an inflammation. If it were, a ſenſation of pain could never happen without drawing an afflux of humours to the affected part to raiſe a ſwelling; but every one knows the contrary by experience; for in a tooth-ach there is very often an exquiſite pain without a ſwelling.

A SWELLING which proceeds from an echymoſis is cauſed by a rupture of the veſſels; but it cannot be ſuppoſed that they burſt in a ſimple inflammation; otherwiſe how could the fluids ſtagnate in them, as

Boerhaave aſſerts ? in a perfect contuſion, as the circulation ceaſes in the contuſed part, it muſt grow ſtronger and more frequent in the collateral and ſubjacent veſſels; from whence ariſes very often an inflammatory ſwelling, which ſome Authors, without any foundation, attribute to a ſtagnation of the fluids in theſe veſſels.

THE ſwelling of an inflamed part is eaſily accounted for, according to our doctrine; for whenever the erethiſm of the veſſels with the velocity of the fluids is preternaturally encreaſed, the action and re-action of the fluids and ſolids being more frequent and ſtrong, the veſſels by their continual agitation and diſtenſion are weakened, loſe their tonic and contractile force, and by that means their pores become ſo enlarged, that the humours can eaſily paſs through them into the cellular membrane, and produce a ſwelling which will be proportionable to the ſtrength and duration of the erethiſm, and the preternatural velocity of the fluids.

We are to remark that the veſſels, muſcles, and membranes, with every ſenſible part of the body, have a natural tendency to ſhorten themſelves, which by Phyſiologiſts is called a tone or tonic action; it is ſo much augmented in an inflammation, that the pores and orifices of the capillaries become ſo narrow, that little or nothing can paſs through them; but when this action is overpowered by too much diſtenſion, or by the vehement impulſe of the fluids from behind, the fibres are ſomewhat lengthened and relaxed, and the pores become ſo wide, that the humours can eaſily paſs through them into the aforeſaid membrane. The force of the ſtimulus and erethiſm may be ſo great, as to overcome this action in an inſtant, and cauſe a ſwelling, &c. as in *β*. N°. 3, 4, 5, 6, 7, 8. This action ſupports us when we are awake, and it is ſo much leſſened by ſleep, that it is partly on that account we are ſomething taller in the morning than going to bed. In a palſy the mouth is drawn towards the healthy ſide, by a tonic contraction, and not by a muſcular motion, as many Authors pretend.

As Dr. Haller, Profeſſor of Phyſic in the Univerſity of Gottingen, has proved by the authority of Sir Clifton Wintringham, that the capillary veſſels are much ſtronger than their trunks, it cannot be conceived how a ſwelling can take place in them, eſpecially in an inflammation, wherein their bulk and diameters are leſſened by their tonic action and erethiſm.

See what is quoted from Dr. Haller, Sect. II. Φ. 6.

β. 6. As the redneſs of an inflamed part proceeds from the encreaſed velocity of the blood, it cannot be accounted for according to Boerhaave; becauſe in Aph. 371, he ſuppoſes the fluids to ſtagnate, and remain without motion in the inflamed arteries. The ſame thing may be ſaid of pain and the acceleration of the pulſe; becauſe they are no leſs the immediate effects of an inflammation than redneſs, as appears from the application of the definition I have given in the beginning of this ſection.

When any part of the human body is irritated, the heart ſends it ſo great a quantity of blood, that it will ſoon cauſe redneſs, &c. as in β. N°, 1, 2, 4, 5, 6, 7, 8, of this ſection,

tion, if the cauſe is not removed or overcome by nature or art.

β. 7. PAIN is a diſagreeable ſenſation, which excites all living creatures to employ the utmoſt of their power to remove its cauſes. The artifice which nature uſes to free herſelf from it, is very admirable; for ſhe ſeldom fails to ſend a flood of humours to any part affected with pain, even independent of the will. Pain ſuppoſes a ſtimulus and the ſenſibility with the irritability of the fibres as antecedent cauſes; but it ariſes immediately from an erethiſm of the veſſels, and the impetuous velocity of the fluids, which both combine to irritate and diſtend theſe veſſels ſo much beyond their tone, as to cauſe pain. See page 15.

WE may ſee what is here aſſerted confirmed in Quadrupedes, when by a natural inſtinct, they contract their *tunica carnoſa*, to drive away the flies.

β. 8. The ſtricture and erethiſm of the veſſels is greater in proportion to the intenſity of the inflammation, and of conſequence, the quantity of humours is leſſened in them, it muſt, therefore, be encreaſed in their collaterals. In the mean time, the heart, according to the laws inſtituted by provident nature, doubles its contractions, in order to free it's ſubſervient veſſels from their ſtricture and erethiſm; hereby the action and re-action of the ſolids and fluids become ſtronger and more frequent, and conſequently the pulſe muſt be accellerated.

SECT.

SECT. II.

Of an ERYSIPELAS.

AN Eryſipelas, according to Boerhave, is an inflammation of the ſecond order. Before I explain this celebrated Author's opinion, I will preſent my Reader with what Fernellius has collected from the Antients on that ſubject.

" ERYSIPELAS, ardor eſt vehemens per corporis ſumma diffuſus. Nec tumore manifeſto extuberat, nec partem attollit aut diſtendit, nec penetrat in ſubjectam carnem, ſed late diffunditur nulla collectione circumſcriptum. Quamcunque partem prehendit, vehementer mordicat

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& urit: color ineſt ex rubro flaveſcens, qui preſſu ſubterfugit, moxque redit. Dolor nec pulſans nec admodum vehemens eſt. Quum fluxio excutitur, horror quidem ac dein febris hominem adoritur: ac ſæpe quum in crura irruit, ab inguinis tumore initium ducit. Serpit id quidem herpetum more, atque priori derelicta ſede, in vicinas partes ſenſim obrepit. Eſt autem duplex, unum quod ſimplex eryſipelas Celſo appellatur, ſolo rubore & ardore, nulla exulceratione moleſtum. Alterum quod eidem ſacer ignis nuncupatur eſtque exulceratum eryſipelas. Hujus duæ ſpecies ſunt, una qua ſumma cutis ſine altitudine exulceratur, in qua & cruſtulæ inſtar furfuris excitantur: altera cujus exulceratio altius in cutem penetrat, e qua ruptis puſtulis purulenta ſanies exit. Simplicis eryſipelatis origo eſt a fervente tenuique ſanguine, qui bilioſus appellatur: exulcerati vero ex eo cui bilis ſupervacuæ ejuſque incaleſcentis nonnihil ſit admiſſum. Is e venis tenuioribus propulſus nequaquam in carne ſubſiſtit & hæret, ſed tenuitate in cutem fertur & evolat, quæ denſior & compactior hunc retinet cohibetque. Quumque tenuis ſit humor facile diſpergitur, neque in conſpicuum tumorem ſe attollit. Genus hoc univerſum exquiſitum eſt eryſipelas: quod vero phlegmonodes appellatur, tumentius quidem, ſed minus fervidum exiſtit multoque minus oedematodes." Vide Fernel. De extern. corp. affect. cap. 4. lib. 7. Pathologiæ.

Φ. 1. WHEN an inflammation does not penetrate deeper than the integuments, and cauſes no apparent ſwelling, it is called an eryſipelas,

not only by Fernellius, but by all the Antients and Moderns.

Φ. 2. A SIMPLE eryſipelas manifeſted by a redneſs and parching heat, can hardly be diſtinguiſhed from an exquiſite phlegmon; for it has all its characters except a tumour, but I have ſhewed in the foregoing ſection, that a tumour is not eſſential to an inflammation; nor has our Author any reaſon to aſſert, that it proceeds from a bilious blood, for the bile is not red; yet this diſorder may happen, when the bile is of a bad quality, or when it is diffuſed over the ſurface of the body.

Φ. 3. OUR Author, as all the Antients and moſt of the Moderns have done, concludes, that the yellowiſh colour of the part affected by an eryſipelas proceeds from the bile; but I have obſerved very often, that this colour does not appear until the diſorder is upon the decline, either towards a reſolution, or a ſuppuration. Van Swieten attributes this yellowneſs to the ſerum, in his Commentary on Aph. 390. But to prove this aſſertion, it would be neceſſary, that nature ſhould ſend the ſerum only to the affected part; but it cannot be conceived how that could be effected according to the known laws of the animal œconomy; for we know by experience, that ſuch as labour under this diſorder, are no way diſpoſed to ſweat, nor have any moiſture perceivable on their ſkin; on the contrary, they appear to the touch to be dry and parched, and burn all over with heat; and it follows from what is ſaid in page 41, that the heart in that ſituation, cannot be diſpoſed to ſeparate ſerum from the blood to be ſent preferably to any other humour to the irritated part; for which reaſon, it is not more likely, that a yellow colour in an eryſipelas ſhould rather ariſe from the ſerum than from the blood.

Neither the blood nor any other humour is black; but when collected in contuſions, they take on that colour; may not therefore the blood decompoſed by the heat and pulſation of an inflamed part, change its colour from red to yellow? Beſides, as the red blood is thicker than the ſerum, it cannot ſo eaſily paſs off by reſolution; therefore, it ſhould be more retained in the affected part than the ſerum. Moreover, we are to remark, that Leuwenhoek obſerved the colour of the blood to proceed from the union of the white globules; therefore, that union being diſſolved by the rarefaction ariſing from an inflammatory heat, may occaſion the red colour to vaniſh partly or entirely, which, perhaps, happens in the preſent caſe; and this is further proved by Dr. Sauvage, in his Phyſiology[*], where he ſays, that the redneſs of the blood proceeds from its thickneſs, and proves it by the authority of Sir Iſaac Newton, who has demonſtrated, that bodies were red, becauſe the thickneſs of their particles was equal to $\frac{1}{15,000,000}$ of an inch; that they appeared yellow, becauſe they were equal to 20,000,000 part of an inch, and to appear black, if one, &c.

All Phyſicians allow, that an eryſipelas is never produced without a preternatural encreaſe in the motion of the fluids, and for that reaſon, it is not certain, that a greater quantity of ſerum is ſent or derived to an inflamed part, than what commonly circulates with the blood. See *β*. 2. of this Section.

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[*] Vide, pag. 179 and 199.

Φ. 4. ALTHOUGH an eryſipelas cauſes no manifeſt ſwelling or diſtenſion, yet we know by reaſon and experience, that it ſeldom can happen in any external part of the body, without attracting to it a greater afflux of humours than what is propelled to it by the common laws of circulation in a healthy ſtate; and that of conſequence the part muſt ſwell in ſome meaſure, except in ſome conſumptive habits, wherein the radical moiſture is exhauſted, and the vis vitæ is unable to propel the fluids to the circumference of the body, or in thoſe in whom the ſebacean humour is entirely wanting.

Φ. 5. As it cannot be comprehended, that an ulcerated eryſipelas can exiſt without pain, we can conclude from theſe remarks, that Fernellius ſuppoſes an eryſipelas to be attended with heat, redneſs, ſwelling and pain, which, according to Celſus, are the four chaſteriſtics of an inflammation.

Φ. 6. We have remarked under Φ. N°. 5. Sect. 1. three ſeries of veſſels through which the blood or any other humour is to paſs, according to our Author, before it can work its way into the cellular membrane to form an inflammatory tumour. Fernellius ſeems alſo to have hinted here, that theſe three ſeries of veſſels are continued one into another, and that the humours cannot paſs from the firſt and ſecond into the cellular membrane, or empty ſpaces, as he calls it; but if every part of theſe two ſeries as well as the third, had not inſpiring and expiring veſſels and pores that open into the cellular membrane, there could be no ſupply of oil or moiſture to preſerve the ſenſibility of the nerves, veins, and arteries, and the flexibility and elaſticity of the muſcles, tendons, ligaments, and cartilages; they would ſoon grow ſtiff and break by the leaſt motion, juſt like a twig, which withers by being long expoſed to the ſun, and breaks before it can be in the leaſt bent.

I HAVE obſerved, that many People who were long ſubject to ſcorbutic or venereal complaints, break their limbs by very ſmall force, which muſt certainly be owing to the want of that oily balſamic humour, that paſſes in a ſtate of health from the veſſels not only into the cellular membrane, but even into the ſubſtance of the bones. But when the veſſels are attacked by a ſlow continued erethiſm, as in the aforeſaid diſeaſes, this balſamic humour cannot always paſs, and when it does, it grows acrid, or evaporates before it can get a ſupply; becauſe the erethiſm or action of the veſſels is very irregular in ſuch People, on account of the great changes which the non-naturals produce in their infirm bodies.

From theſe examples, we may venture to ſay, in conjunction with Helmontius and Hippocrates, that every part of the body, both inward and outward, and conſequently of the vaſcular ſyſtem, is inſpirable and expirable; it is therefore reaſonable to think, that there are pores through the whole length of the veſſels, by which a humour paſſes into the cellular membrane, when the circulation is in a natural ſtate; it is therefore probable, that when the tonic action of an inflamed veſſel is weakened or aboliſhed in any part by too great a diſtenſion from plenitude, the pores may become ſo wide in that part, as to admit the red globules or other humours to paſs through them into the cellular membrane.

For which reaſon, it does not ſeem neceſſary to ſuppoſe, that the morbific humour in an inflamed artery ſhould paſs through its extremity before it can get into that membrane. Beſides, by what Dr. Haller extracted from the experimental enquiries of Sir Clifton Wintringham, it appears, "that in general the trunks of the arteries are in all parts of the body weaker and the branches ſtronger in their coats; whence the impulſe of the blood may exert a conſiderable effect upon the former, but leaſt of all on thoſe of the limbs.

FROM hence it is, that aneuriſms are moſt frequently formed near the heart; for in the lower extremities, the ſtrength of the arteries and of the veins too is much encreaſed.

AND the proportion of the arterial membranes or coats in thickneſs, with reſpect to their bores or capacities, is greater as the arteries grow leſs, and is thickeſt in the leaſt of them, which can tranſmit only one globule at a time. The truth of this is proved from anatomy, and the forcing of air into the arteries, by which they burſt always with more difficulty as they are leſs; and from the calculation itſelf, by which the magnitude of the leaſt arteries is determined from the globules, diſtending their two ſemi cylindric membranes.

Anatomists have erroneouſly ſuppoſed the ſtrength of the arteries and veins to decreaſe, in proportion as they grow leſs in thickneſs, for by experiments, it appears, that the thineſt veſſels have often a much greater degree of compactneſs and ſtrength proportionable than the larger; and ſome whoſe coats are extremely thin, exceed in ſtrength the aorta, whoſe coats are ten times as thick. The emulgent artery was found a fifth or ſixth part ſtronger than the aorta at the heart, and the emulgent vein was found two thirds ſtronger than the cava, &c.* ”

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* See remark on § 153, of Dr. Haller's Phyſiology, containing an extract of Sir Clifton Wintringham's experimental enquiry, concerning the arteries and veins, tranſlated into Engliſh by Dr. Mihles.

HENCE it is more than probable, that the tonic action of an inflamed artery can ſooner be overcome by diſtenſion in any point where it is preternaturally diſtended, than in its apex or extremity, notwithſtanding what Fernellius, Boerhaave and all other Authors affirm to the contrary; therefore I ſee no neceſſity of ſuppoſing the morbific humour to paſs from the ſanguineous arteries into another ſmaller ſeries of veſſels, to form an inflammation by error of place. Why ſhould it not paſs rather into their correſponding veins, if the ſerous or lymphatic arteries be not intermediate between them? if they be, the blood with every kind of humour ſhould always paſs through them before it could arrive in the veins. Such an aſſertion would be very abſurd, though it may be inferred from Boerhaave's way of reaſoning in the following aphoriſms.

" 372. QUODQUE ergo fieri poteſt vel in finibus arterioſis, vel in vaſis ſeroſis lymphaticis aliiſque minoribus, arterioſis dilatatis oſculis admiſſos globulos rubros aut alia fluidi elementa craſſa, per fines tranſmittere non potentibus. Si ſanguis transfunditur in eas venas, quæ ſpiritibus accommodatæ, inflammationem excitat. Celſ. 5.

378. EFFICIUNT eam in vaſis lymphaticis arterioſis. 1. Omnes cauſæ, quæ initia horum latiora ampliant, ita, ut in ea intrent partes ſanguinis eraſſiores, quæ propulſæ ulterius occurrunt anguſtiis conni ventibus, ubi tum patiuntur eadem, quæ expoſita (377); talis eſt laxitas vaſculi in ſuo principio, motus violentus liquidi arterioſi: 2. Omnes cauſæ alteri inflammationi communes. 375, 376.

379. Unde et ſimilis morbus in omni vaſe conico, ubi fluit ex lato in anguſta liquor, obtinere poteſt ; ut enim in ſanguine rubro ſic in lympha alia eſt forte pars craſſior reliquis.

380. Ex quibus vera diverſitas phlegmones eryſipelatis, oedematis, ſchirri cum inflammatione liquet."

β. 1. An artery, according to Boerhaave, is like a cone whoſe baſe is in the heart, and *apex* in the extremities of the body. An eryſipelas takes place nearer the *apex* of the cone than a phlegmon, and it advances ſometimes as far as the lymphatics, where it is produced by error of place. The ſerum, according to this Author, is yellow, and in his Commentary on aph. 127, ſays, that in the ſerous arteries there may be a red or yellow inflammation, the firſt happens by error of place, the ſecond is peculiar to theſe veſſels.

If a little cruor with much ſerum ſtagnates in the pellucid veſſels, which are obſtructed and inflamed, the affected part will then appear of a reddiſh yellow, and this ſort of inflammation he calls an eryſipelas.

Hence alſo appears the affinity betwixt an eryſipelas and a phlegmon, ſince they only differ in the magnitude of their obſtructing particles; for in a phlegmon the red part of the blood is accumulated in the obſtructed and diſtended veſſels; but in an eryſipelas, the ſerum of the blood, mixed with a little cruor, becomes impervious in the ſame manner; alſo the ſeat of a phlegmon is the membrana adipoſa, whereas an eryſipelas invades the external integuments of the body, or the internal membranes.

In this extract we may ſee what our Author means by an inflammation of the ſecond order proceeding from an error of place; but I will clearly ſhew by fair arguments drawn from the nature of the ſolids and fluids, that this doctrine is contrary to reaſon and experience.

β 2. It is a well-known truth, that the ſkin is more or leſs dried or parched in a fever, according to the vehemence of the ſymptoms, of which we may daily ſee evident proofs in an ardent fever. I ſuppoſe no Phyſician will deny, but the dryneſs of the ſkin in this caſe proceeds from the conſtriction of its veſſels, whether they be ſanguiferous, ſerous or lymphatics; but in an inflamed part the ſtricture of theſe

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veſſels muſt be far greater than in an ardent fever; they ſhould therefore exclude not only the red globules, but alſo the peculiar humours to which they are deſtined, and from thence become parched and dried.

Hence we ſee the reaſon why a reſolution does not happen before an inflammation ceaſes, and why a moiſture is not perceivable on the ſkin in an ardent fever, before it is upon the decline; it appears, therefore, from this experimental proof, which is obvious to every Practitioner, that in an eryſipelas, and in every kind of inflammation, the ſerous and lymphatic veſſels are under ſo great a ſtricture by an erethiſm, that they exclude all kinds of humours, and of conſequence all degrees of ſwellings; from thence we may ſee, that it is improbable an inflammation can take place in theſe veſſels by error of place. For that reaſon, we can conclude, that the plenitude and derivation of humours, which happen upon ſuch occaſions, take place rather in the ſanguiferous veſſels, or in the cellular membrane, or in both together than in the former; therefore, it plainly follows, from the nature of the ſerous and lymphatic veſſels, that our Author's doctrine, concerning an inflammation of the ſecond order, is contrary to experience.

β. 3. IN page 41, we have proved, that the blood as being groſſer than the ſerum or lymph, ſhould come in a greater quantity than either of theſe to an inflamed part, and that the thickneſs of the humours in this caſe, is in proportion to the force of the inflammation; theſe are immediate conſequences of the laws of ſecretions;

for it is allowed by all Phyſicians, that the motion or force of any organ in the human body is greater in proportion, as it is nearer to the heart; therefore, the humours ſecreted in them will be thicker, according to their diſtance from that center of motion.

Hence may be underſtood, why the urine ſecreted in the kidnies, and the bile ſecreted in the liver, ſhould be much thicker than the animal ſpirits, and the humours which in a ſtate of health, paſs off by ſweat and by inſenſible perſpiration; becauſe theſe three laſt are ſecreted by organs much more diſtant from the heart than the liver, or kidnies; but the action of the ſolids is preternaturally encreaſed in every inflamed part, therefore, the humour derived to it will be thicker in proportion to the violence of that action; but the thicker it is, the more it irritates and conſtringes the capillary veſſels, until it ſhuts them up ſo cloſe, that it cannot enter their orifices; it follows, therefore, from this argument drawn from the nature of the fluids, that our Author's doctrine, concerning an eryſipelas, or an inflammation of the ſecond order, is contrary to experience and the laws of ſecretions.

β. 4. WHAT I have here aſſerted ſeems to be confirmed by Fernellius, whoſe book is nothing more (if you except his ſtile and language) than a copy of all the antient phyſical Authors, who jointly attribute the malignity of inflammatory tumours to the greater groſſneſs of the humours they contain; it is for that reaſon, they all agree, that a carbuncle and a furuncle produce melancholy effects; becauſe they ariſe from a groſs fervent blood, &c. as appears from what follows.

" CARBUNCULUS ex ſanguine originem habet, non eo quidem tenui & laudabili, ſed craſſo ac nigro, calido tamen fervente atque corrupto. Hic in quamcunque partem invaſerit, eam mox exurit, puſtulas circum ſe ardentiſſimas acerrimaſque ciet, tandemque ardoris vi cruſta vel nigra vel cinerea obducitur. Huic partes vicinæ longo ſæpe tractu conſentiunt, caloris doloriſque participes: valida quoque febris acceſſitur. Inflammata pars nunquam ſuppurat, ſed fervore exuſta corruptæ carnis lobum tandem excutit, quo excidente, ulcus cavum ſordidumque manet, hocque uno maxime a cæteris ſejungitur tuberculis. Carbunculorum alius ſimplex, qui e ſolo ardore ſimplicique putredine naſcitur, alius malignus, qui his etiam

jungit venenatam qualitatem: talis in peſtilentia graſſatur, de quo plura proprio loco diximus."

"Furunculus dothien Græcis appellatus tuberculum acutum cum inflammatione ac dolore, ovum columbinum magnitudine non excedens. Phymate ergo minus eſt, ſed acutius, rubentius, ac dolore gravius. Phlegmones veram ſpeciem exhibet, ſed ejus exiguæ & quæ vix infra cutem deſcendat, atque ſubjectæ carnis minimum comprehendat. Suppurat furunculus perinde atque phlegmone, hincque a ſimplici carbunculo diſcernitur. Fit autem non quemadmodum phlegmone e probo ſanguine, qui in particulam vi quadam irruat: ſed e craſſo & vitioſo, non perinde tamen atque in carbunculo exuſto, quem a reliquo puriore natura ſecernens tanquam inſenſum atque inutilem

in corporis ſumma propellit. Quocirca ut phlegmone multitudinis, ſic furunculus cacochymiæ ſaboles eſt: raroque fit ut hic ſolitarius erumpat, ſed fere multis corpus ſcatet atque inquinatur." Vide Fernel. De extern. corp. affect. cap. 2. lib. 7. Pathologiæ.

THE compariſon here made by our Author, between a carbuncle, a furuncle, and a phlegmon, plainly ſhews, that their different degrees of malignity and intenſity is owing to the groſſneſs of the humours, from which they proceed; and this was not the opinion of Fernellius alone, but of all the Antients, from whom he copied; therefore, the concluſion we have drawn in β. 2. and β. 3. of this ſection from experience, the nature of the fluids, and laws of ſecretions agree with the opinion of all the Antients. For which reaſon,

ſon, it cannot be ſuppoſed, that what we ſay is founded upon mere ſyſtem or hypotheſis; for all the principles of our doctrine are deduced from reaſon and experience; and indeed, no principle ſhould be adopted in phyſic, which has not ſuch a real baſis.

HENCE we may judge, that the herpes, the itch, and all the other diſeaſes of the ſkin are produced by an effort of nature, to debarraſs herſelf of the irritating cauſes from whence they proceed.

β. 5. I HAVE proved above in ſect. 1. that no obſtructions or ſtagnations can be ſuppoſed to take place in parts inflamed by the pricking of a thorn, ſtinging of Bees, Waſps, &c. It ſhould not therefore be ſuppoſed, that the groſſneſs of the humour which is derived to an in-

inflamed part, is owing to its ſtagnation, or to the obſtruction it meets with through the ſmalleſt capillary veſſels, let them be of what kind they will. Beſides the entrance of the humours into theſe veſſels is very much hindered by their ſenſibility, which by Boerhaave himſelf and his followers, is judged to be very exquiſite.

The moſt minute veſſels in the human body are employed in the ſecretions and excretions, and particularly in thoſe of ſweat and inſenſible perſpiration; and as the functions of theſe veſſels are moſt commonly ſuppreſſed or interrupted in an ardent and in all vehement inflammatory diſorders, and the circulation at the ſame time is carried on in the largeſt veſſels, we may lawfully infer that the ſmalleſt veſſels in the body are more ſenſible than the largeſt; and that it is probable the force of a ſtimulus, be it internal or external, ſooner invades the ſmalleſt than the largeſt veſſels. As a ſaburra is ſooner felt in the head than in the ſtomach, which it immediately vellicates, ſo, in the ſame manner, an impreſſion made in the largeſt veſſels may affect them leſs than their contiguous capillaries.

It is thus, the ſmall veſſels when irritated, ſollicit nature to ſend a greater quantity of fluid than uſual to their neighbouring large veſſels, which by preſſing the *Oſcula* or origin of the former cauſes a ſtricture in them, and an irritation proportionable to the quantity of fluid, which, upon theſe occaſions, is ſent by the heart to the affected part.

It is thus, the capillaries concur by their ſtricture to form ſwellings in their contiguous large veſſels, and in the cellular membrane, and exclude it from their own cavities, which is quite contrary to what has been hitherto imagined. If the functions of the capillaries were not thus regulated, and if diſtenſions or tumours could ſo eaſily take place in them, as moſt Authors have ſuppoſed, their texture would be ſoon deſtroyed, all the fluids would extravaſate, and put an entire ſtop to the circulation in every inflammatory diſorder.

β. 7. Boerhaave's doctrine concerning an inflammation of the ſecond order is quite inconſiſtent with the mechaniſm by which the circulation is carried on in the capillaries; becauſe the ſuction and attraction,

tion, on which it entirely depends in theſe veſſels, are much diminiſhed, diſturbed, and almoſt quite aboliſhed in ſome inflammatory diſorders, on account of their ſtricture and erethiſm, as it is proved in β. N°. 1. and 5. of this Section.

β. 8. BOERHAAVE's doctrine is contrary to the very arguments the celebrated Van Swieten produces for its proof in § 372.

THE ſurface of the ſkin grows red in perſons who run or walk faſt (ſays our Author) and in ſuch as cry out loud, or uſe violent exerciſe; he attributes the redneſs in theſe caſes, to the blood's getting into the ſerous, or lymphatic arteries, and from this argument he and all Boerhaave's Followers conclude that an inflammation takes place in theſe veſſels by error of place.

The redneſs obſerved in theſe caſes is no proof that an inflammation can happen by error of place; it can only be called at moſt, a diſpoſition towards that diſorder; for it is ſeldom or never attended with any pain, and it vaniſhes according as the impreſſion of the ſtimulus ceaſes, which indeed could not happen ſo ſoon, if the red globules were wedged into the ſerous or lymphatic arteries, eſpecially if their ſtructure is ſuch, as it is repreſented by ſome of thoſe who defend Boerhaave's doctrine. For from every ſecretory organ according to them, there ſpring out canals of ſuch different ſtructures that through ſome the red globules can paſs, whilſt the white globules only can get into the other canals. They ſay likewiſe that one red globule is equal in bulk to ſix or ſeven white ones, and that ſweat and inſenſible perſpiration paſs out through pores and veſſels of different kinds or diameters.

If all that be true, how can it be conceived that the red globules once impacted in the ſerous or lymphatic arteries can return back by their proper canals into the maſs of blood? Beſides, how is it poſſible that the ſerous or lymphatic arteries can be ſo much dilated, as to admit the red globules of the blood? certainly if they did, the redneſs upon theſe occaſions would not ſo ſoon vaniſh.

In all ſuch caſes a greater column of blood than uſual is ſent to theſe parts to rid them of the irritation from which the redneſs proceeds. (See Sect. 2.) And perhaps the difference of theſe veſſels is not greater than that which is between the pores and veſſels through which ſweat, and the matter of inſenſible perſpiration do commonly paſs; and which now by Phyſicians of the firſt diſtinction are judged to be the ſame.

Leuwenhoeck had diſcovered by the help of his microſcope that the humour which ſeemed to be white in the capillaries, became red in the trunks; therefore we have reaſon to think that the redneſs which appears in the ſkin of thoſe who run and uſe violent exerciſe, is owing rather to a greater column of blood than uſual, ſent thither by the ſympathy of the heart, than to an error of place.

The whiteneſs of the eyes proceeds from a ſlowneſs of circulation; but in order to account for it, it is not neceſſary to ſuppoſe their veſſels ſo ſmall as not to admit the red globules of the blood; for if it was ſo, nature could not conveniently ſend her univerſal remedy to relieve theſe organs, upon an emergency, from any accidents. The ſame thing may be ſaid with regard to the whiteneſs of the ſkin, which is different in ſickneſs, and in a ſtate of health, according to the difference of circulation, as it may be ſeen in the ſame Girl when ſhe is well, and when ſhe labours under a chloroſis. The greater capacity of the veſſels hinders not the humours they contain from being thin, eſpecially, as the veſſels of the eye, the brain, &c. are at a certain diſtance from the heart. This is eaſily perceived by thoſe who know the laws of the ſecretions.

HENCE it is probable, that the circulation is ſtronger in a red roſe, and that it contains a greater quantity of *ſpiritus rector* than a pale one, and that the difference of their colour may be thus accounted for.

I ALLOW that the veſſels which we call lymphatics, ſhould be narrower than thoſe wherein the red blood commonly circulates; becauſe as the circulation is ſlow in the former, they are ſeldom alike diſtended with fluids; for which reaſon, their ſides muſt certainly approach one another, and according to the mechanic laws of the ſecretions, they ſhould attract the fineſt and thineſt part of the humours; but it does not follow from thence, that the ſerous and lymphatic veſſels cannot at one time admit a greater, and at another time a ſmaller quantity of fluids; nor does it ſeem conſiſtent with the laws of the animal oeconomy, that they ſhould be otherwiſe contrived.

Moreover we know that the variety of colours depends upon the different reflections of the rays of light, and that the difference in theſe reflections proceeds from the different configurations of the bodies which reflect them. From hence and from the experiments of Leuwenhoeck, it is probable that a certain quantity of lymph gathered together may aſſume a red colour. Hence it may be concluded, that the ſyſtems of thoſe who contend, that inflammations may proceed from the red blood paſſed into the ſerous or lymphatic arteries by error of place, is without foundation.

β. 9. Van Swieten, for the greater proof of his aſſertion, uſes alſo the following argument in §. 372. If any part of the body, ſays he, is expoſed to the vapours of warm water, it will ſwell and look redder than uſual, from the ingreſs of the red blood into the ſmaller, relaxed ſerous or lymphatic arteries; from hence he concludes, that in inflammations, in the ſame manner, theſe veſſels are ſo relaxed near their origin, that the red blood and other thicker humours than what uſually circulate in them, can freely enter their orifices, and cauſe an inflammation of the ſecond order.

CERTAINLY redneſs in this experiment does not proceed from a laxity of the capillary veſſels in their origin, but rather from an irritation excited by the heat of the water. But if the body or any part of it, is for a certain time expoſed to the like vapours, it becomes ſoft, relaxed and pale. Hence we ſee that ſome caution and prudence is required in the application of ſuch vapours. Beſides, as it is proved (page 76)

76) that the capillaries in proportion to their cavities or diameters are ſtronger than the largeſt veſſels; it cannot be ſuppoſed that the vapour of warm water could ſo ſuddenly relax them.

Moreover, as it is allowed, that there are blood veſſels all over the ſurface of the body, and that they are larger than the ſerous or lymphatic veſſels, their tunics alſo muſt be weaker than thoſe of the latter; (page 76) and conſequently ſhould be ſooner and more eaſily relaxed; therefore, as laxity muſt begin in the blood veſſels in the above experiment, their ſtrength muſt be diminiſhed, and for that reaſon they cannot be ſuppoſed to propel the blood more than uſual into the aforeſaid veſſels; on the contrary, they ſhould propel it leſs than in a natural ſtate. It is thus, the large veſſels when relaxed in a dropſy, cannot propel the humours to the circumference of the body, as appears from the dryneſs of the ſkin in this diſorder; therefore, as redneſs in the above experiment cannot proceed from the greater laxity of the ſerous or lymphatic veſſels, or even of the blood veſſels, it muſt ariſe from an irritation occaſioned by the heat of the water.

β. 10. It is ſurpriſing that the redneſs of the ſkin after running, hard labour, or violent exerciſe, ſhould be judged by the celebrated Boerhaave and Van Swieten, to be a preternatural ſtate; for it would follow from thence, that young men and all thoſe who are in perfect health, and in whom the ſkin is always red, ſhould be in ſuch a ſtate, which would indeed be contradictory and very abſurd.

I PROPOSE now briefly to explain the nature of an eryſipelas.

AN eryſipelas is that ſtate of an inflammation wherein the affected part becomes white, when it is preſſed with the finger; but ſoon aſſumes its former colour when the finger is removed.

A glutinous humour is ſupplied by the ſebacious glands to preſerve the ſenſibility of the ſkin, and keep it moiſt, by checking in ſome meaſure, the egreſs of the fluid which goes off through its pores. This glutinous humour being wanting in an eryſipelas, the ſkin is dry and parched, and little or no ſwelling can be perceived; becauſe the erethiſm of the veſſels is but ſmall, and the morbific humours having nothing in their way to retard their egreſs exhale through the expiring veſſels of the ſkin. It is by the want of this glutinous humour that an eryſipelas differs from a hot oedema.

In an eryſipelas the irritability of the ſkin is much augmented through want of the ſebacious humour, which in a ſtate of health covers the extremities of its nerves, and defends them from external objects. The ſkins of Swans, of the Rhinoceros, and thoſe of all amphibious animals, are covered with ſo large a quantity of this humour, that water cannot eaſily penetrate them. The bladder, the inteſtines, the mediaſtinum, pericardium, with all the membranes which line the different cavities of the human body, are covered with a humour not very unlike the ſebacious. The nature of this humour may be better underſtood from what I ſhall in the ſequel quote from Dr. Sauvage, when I come to treat of a ſcirrhus.

It may hence, in the mean time, be underſtood why the inteſtines ſometimes by the force of an inflammation rather grow dry than ſwell; the ſame thing happens not only in theſe organs, but in every other part of the body, when the extremities of the expiring veſſels are not covered with this ſort of humour. But we are to remark, that the extravaſated fluids cannot paſs through theſe veſſels, when they are inſpiſſated by the force or duration of the diſorder, as I am to ſhew when I come to treat of ſuppuration.

SECT. III.

Of an OEDEMA.

“UT pituita alia tenuis, aquoſa, aut mucoſa exiſtit, alia craſſa & glutinoſa, cujusmodi eſt quæ vitrea aut gypſea appellatur: ita neceſſe eſt varios ex hac collecta naſci tumores. Ac primum quidem oedema tumor eſt frigidus, laxus ac mollis, doloris expers. Nec calor, nec rubor, ſed vel genuinus vel albidus duntaxat color ineſt: tumor ſæpe magnus & qui preſſo digito, vel nullo vel exiguo dolore cedit. Eſt autem duplex: unus collectus & circumſcriptione definitus, qui proprie ac ſimpliciter oedema nuncupatur: alter diffuſus & expanſus, qui rectius tu-

tumor eſt oedematoſus. Hic ex crudiore pituitoſoque ſanguine, aut jecoris aut aſſumptorum vitio progignitur, qui in nutriendas partes illapſus, nec in earum ſubſtantiam converſus, ſenſim cumulatus redundat partemque tumore diſtendit, ac fere retinet prementis digiti veſtigium. Ita ſane in tabe, in cachexia & in leucophlegmatia, modo pedes, modo reliquum corpus omne tumidum evadit. Verum autem & exquiſitum oedema non ex ſanguine pituitoſo, ſed ex pituita fit ſupervacanea, quæ ſolum vel aquoſa, vel mucoſa ſit, undecunque illa in affectam partem deferatur. Fere tamen e capitis diſtillationibus huic origo eſt, quæ ſæpe in genua, interdum in humeros aliaſque partes decumbit."*

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* Vide Fernel De extern. corp. affect. cap. 3. lib. 7. Pathologiæ.

Φ 1. As an oedema may proceed from two ſorts of humours, ſo it is diſtinguiſhed by Fernellius into two kinds; the one which proceeds from a watery humour, and called by our Author a true oedema, to which may be referred cold ſwellings, a dropſy, for example, an anaſarca, &c. and the other kind which ariſes from a ſort of thick glutinous phlegm, called glaſſy or plaſtic. The Antients believed this ſort of matter to be a black kind of bile, or a burnt ſort of blood; but our Author ſuppoſes it to be a ſuperfluous blood, which nature not being able to aſſimilate ſufficiently to nouriſh the body, throws out on the ſurface of the skin, where it produces a hot oedema; and the glutinous matter which covers the skin in this diſeaſe, may be reckoned the principal cauſe why the humours are collected in the cellular membrane in inflammatory diſorders; for when that matter is wanting, they paſs out through the pores, as in an eryſipelas.

Φ 2. Our Author does not clearly ſhew the difference between a cold and a hot oedema; the latter is diſtinguiſhed from the former by its heat, and the pain which is felt when the affected part is preſſed; beſides it yields not ſo eaſily to the touch, as in a cold watery oedema, in a leucophlegmacy for example, or in an anaſarca; neither does the skin retain the impreſſion of the finger ſo long as in theſe cold diſorders; but ſtill longer than in an eryſipelas, nor is the colour of the part changed unleſs there is a diapedeſis.

Φ. 3. I shall ſhew when I come to treat of ſuppuration, that an inflammation is moſt commonly oedematous,

matous, and that one method of cure may be ſufficient in a phlegmon, an eryſipelas and a hot oedema. It can hardly be underſtood from our Author how a hot oedema can be inflammatory; for he ſeems to attribute it to bad digeſtion or the diſorders of the liver; however, it is reckoned a true inflammation by Van Swieten, in § 380 of Boerhaave's aphoriſms.

From the obſervations I made in the Hoſpitals of Paris, I found that a great number of Patients when weakened by the duration of their ailments, were wont to complain of an intolerable pain all round the abdomen, and in three or four days afterwards to have its whole cavity diſtended with fluctuating water. I alſo obſerved, that others complained of the like pain in the inferior extremities, before the water deſcended to the legs and feet. I have ſeen others recover from dropſies by taking antiphlogiſtic purges after bleeding.

We are to remark alſo, that the celebrated Dr. Mead, cured an hydropick Patient by narcotics. Willis employed them alſo with ſucceſs in a ſimilar caſe, and the learned Spon cured an hydropick by twenty bleedings.*

These facts being premiſed, and the ſimplicity of nature in her operations being attended to, quere, whether there be any analogy between a cold and a hot oedema, and whether they both proceed from ſimilar mechaniſms? Certainly the ſymptoms which precede the ingreſs of the ſerum into the cellular membrane are not very unlike thoſe which are obſerved before ſuppuration takes place. In both caſes, to be ſure, nature ſtruggles as much as poſſible, before ſhe admits the humours into the cellular membrane, and commonly the reſiſtance upon theſe occaſions is very great, eſpecially in dry melancholick habits, as I have obſerved very often. I attributed the dropſy of this claſs of Patients to ſpiſſitude and want of ſerum in the maſs of blood occaſioned by an exceſs of perſpiration, which ſometimes happens to be ſo immoderately great in this ſort of People, that the blood is ſo much deprived of its vehicle, that it cannot furniſh the minute ramifications of the nerves or lymphatics, with a ſufficient quantity of the fluids to which they are diſtined. Hence the force of the ſolids is diminiſhed which occaſions a lentor, weakens digeſtion, and brings on a dropſy.

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* See Medical Precepts, by Richard Mead, M. D, chap. 8.

A HOT oedema ariſes from a column of humours preternaturally encreaſed and diſtending ſo much the ſides of the veſſels, that it cauſes pain. If the diſtenſion and pain continue for any time, the veſſels loſe their tone and contractile force, the pores are enlarged and a free paſſage opened for the humours into the cellular membrane.

ALMOST the ſame thing is obſerved to happen in a cold oedema; for the veſſels being too much compreſſed by a ſuperabundant quantity of ſerum, the Patient feels great pain, or a very conſiderable anxiety, until at laſt, the veſſels deprived of their tone and contractile force permit a free paſſage to the ſerum into the cellular membrane, or into the other cavities of the body.

From hence we may ſee, that the veſſels and pores can be dilated by too much motion or by too much laxity. The laſt caſe is quite foreign to my ſubject; I only mention it, in order to take away the equivocation which might ariſe from a cold and a hot oedema. I proceed now to ſhew the defect of Boerhaave's doctrine concerning the latter.

A hot oedema, according to Boerhaave, takes place in the lymphatic arteries nearer the apex of the cone than an eryſipelas, and in that they differ from one another; beſides the blood has no ſhare in producing this ſort of oedema.

An oedema is the ſecond ſpecies of inflammation of the ſecond order according to our Author, I have proved in ſect. 2. β. N°. 1, 2, 3, 4,

5,

5, 6, 7, 8, and 9, that it cannot poſſibly exiſt.

Although it is evident from what has been ſaid in ſect. 2, that nature cannot ſend a particular humour different from the blood to form an oedematous ſwelling; yet I will for a moment admit the ſuppoſition and reaſon in conſequence of the following quotation, wherein Boerhaave maintains the lymph to be the quinteſſence of the blood. "Aquoſior, fluidior, ſalina, ſpirituoſa portio cruoris ſic ſeparatur ab arterioſo ſanguine ope glandularum, quæ vadit in vaſa minima ad motum & nutrimentum; reliqua pars craſſior, rubra venis redditur ſenſim latioribus ſine obſtructionis metu; ergo cruor arterioſus primo venoſo dilutior magiſque lymphaticus, cujus effectu vaſa majora aperta tenentur, robur corpori datur, materies conſtantiori refectui ſervatur, ſed inde venoſo cruori dilutionis neceſſitas, ut fluat, iterum per arterias minimas pulmonales aliaſque: hocce effectu lympha glandulis ſecreta functa ſuo munere et circuitu redditur immediate vel per ductum Pequeti ante novum in cor ingreſſum."*

As it appears from hence, that the lymph is accounted by Boerhaave to be the moſt ſpirituous part of our fluids, and to be the chief agent of nutrition and animal motion, its quantity with regard to the other humours, ſhould be very ſmall, and the veſſels which contain it ſhould be alſo ſmall in proportion, if compared with thoſe which contain the reſt of the humours. For the ſame Author aſſerts in his chymiſtry, by the authority of Mr.

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* Vide Inſtitut. Med. § 209. Boerhaavii.

Boyle, that the *ſpiritus rector* of the plants is not equal to the $\frac{1}{100,000}$ part of the water or vehicle which contains it. May not therefore the ſame thing be ſaid of the lymph, which the former accounts to be as it were the ſpiritus rector of the human body. It is well known, that there are many pellucid tumours, called lymphatic, which contain upwards of 9 or 10 lb. of fluid, and the muſcular motion at the ſame time not in the leaſt impaired. Now I aſk of thoſe who defend our Author's doctrine, from whence ſuch a prodigious quantity of lymph can come? From whence ſo much quinteſſence in the blood? To pretend that ſuch an accumulation of fluid could be furniſhed by the lymph, or from a rupture of its veſſels would ſeem altogether abſurd; beſides, how is it poſſible that the blood veſſels could remain quiet and eaſy, and make a truce, as it were, with the morbific matter during the time, which a ſwelling of ſo prodigious a ſize requires to its formation? Therefore, it does not ſeem reaſonable, that nature can ſend any kind of humour preferable to the red blood to form a hot oedematous ſwelling. Indeed it is more likely that the blood, the pus and ichor with all the diverſity of humours which are found in ſuch ſwellings, are engendered by the heat, pulſation and pain of the affected part. Moreover, this ſort of ſwelling comes on ſuddenly, an inſtance of which fell lately under my own obſervation, when a white pellucid tumour of a ſurpriſing bigneſs, I perceived to ariſe round the knee in the ſpace of one night. Such a ſwelling could not certainly proceed from the lymph.

THE Antients attributed oedematous ſwellings to an atrabiliary humour. Modern Authors thought it was eaſier to keep this opinion in view with a little conjectural alteration, than to make obſervations of their own. It is for that reaſon, Boerhaave attributed this diſorder to the ſerum or lymph, and baniſhed the term atrabilis. But as moſt of the Antients underſtood by this term, *fæx ſanguinis*, that is the dregs of the blood, it was more likely to produce a hot oedema, than the ſerum or lymph.

THE term atrabilis, or *fæx ſanguinis*, ſhould not be intirely expunged out of phyſic; becauſe, in the ſenſe of the antient Phyſicians, it comprehended many ideas; for they were ſo exact in diſtinguiſhing the different conſtitutions of their Patients, that they called one conſtitution, phlegmatic, the other ſanguine, &c. Such as they found of a dry hot conſtitution, thoughtful, lively, and given to ſpeculation, they called bilious. Indeed they were not much miſtaken in their account, for theſe People commonly perſpire ſo much, that their blood, not having a ſufficient quantity of vehicle or ſerum, produces heat, coſtiveneſs, and an alkaleſcence of the bile, from whence inflammatory diſorders very often proceed. Tumours ariſing in ſuch habits, were ſuppoſed by the Antients to proceed from an *atrabilis* or *fæx ſanguinis*, that is a thick hot kind of humour wherein the bile had a ſhare. Hence we ſee, that the Antients, though unacquainted with the true mechaniſm of ſecretions, were perſuaded that the groſſeſt part of the humours was derived to inflammatory tumours, (*β.* 2, 3, ſect. 2.)

The extremities of the nerves all over the body, are covered with a mucous or glutinous humour, like that which the ſebacious glands furniſh for the cuticular nerves. The more this humour abounds in the cellular membrane, the more the fluids derived by the force of an inflammation to that membrane, ſhall be detained, and of conſequence the ſwelling ſhall be greater; but as this glutinous humour is ſeldom wanting in the cellular membrane, or in the ſurface of the ſkin, ſo alſo an inflammation ſeldom happens which is not oedematous.

As the thinneſt fluids, upon theſe occaſions, are very requiſite to extinguiſh heat, and prevent concretions, quere, whether this glutinous humour, and the ſtricture of the capillaries were not providentially contrived to detain them in the body?

In ſome conſumptive habits whoſe humours are very acrid, dry, and inſpiſſated, whoſe veſſels are almoſt empty, and in whom the force of the heart is very ſmall, little or no oedema or tumour can be perceived, altho' the ulcers, which ſpread over their legs, thighs and other parts of their body, are evident ſigns that they labour under a very ſevere inflammation. No ſwelling appears in theſe caſes, perhaps, becauſe the ſebacious humour is defective, being conſumed by the long duration of the diſeaſe.

The diverſity of heat obſerved in inflammatory tumours, conſiſts in the different degrees of coction of the morbific matter, whereof I am to ſpeak more at large, when I come to treat of ſuppuration.

I make no doubt, but that ſeveral Perſons, as well as myſelf, have obſerved a phlegmon on its decline, to aſſume ſucceſſively the forms of an eryſipelas and oedema, and by nature or art ſoon to vaniſh; which would not certainly happen ſo ſoon, if they proceeded from an inſpiſſated blood, ſerum, or lymph wedged, if I may uſe ſuch an expreſſion, into the ſmalleſt veſſels.

For which reaſon, as theſe different appearances of an inflammation are known to ariſe ſucceſſively in the ſame place, it ſeems very certain, that they proceed from the ſame cauſe, namely, from the ſame kind of humours, in the ſame ſeries of veſſels, and that they are nothing elſe, but the different degrees of intenſity of the ſame diſeaſe. Beſides, it is known by experience, that they are cured by the ſame remedies, which ſufficiently confirms the truth of what we have advanced upon this article; therefore it is quite needleſs to place theſe three appearances of an inflammation in three different ſections of a cone, and to attribute each of them to a particular humour, and indeed it is quite contrary to what any Phyſician or Surgeon will find verified by obſervation in his own practice.

SECT. IV.

Of the DIAGNOSTIC SIGNS

OF AN

INFLAMMATION.

1. THE Diagnoſtic ſigns of an inflammation may be taken from its definition, page 19, and from its effects, (chap. 1. ſect. 1. β. N°. 4, 5, 6, 7, 8,) and its different names are known from the different parts wherein it takes place. Φ. 4. ſect. 1. chap. 1.

PROGNOSTIC SIGNS.

THE dignity of the affected part, the greatneſs of the ſwelling, the conſtitution of the Patient, and the intenſity of the ſymptoms will declare the future event of an inflammation. Therefore, if the Patient is conſcious that his humours are not vitiated by the pox or ſcurvy, ſcrophulous diſeaſes, &c. that the phlegmon has not penetrated deep into the parts under the ſkin, we may ſafely ſay, that it is void of danger, and that it is like to terminate by reſolution, or at leaſt by a laudable ſuppuration.

When the parts attacked by a phlegmon, are of a firm texture, and have but a ſmall quantity of veſſels, ſuch as the ligaments and glands, the cure is tedious, and ſuppuration cannot be brought on without much difficulty.

The danger is greater or ſmaller according to the pain, heat, pulſation, on, &c. and according as the vaſcular ſyſtem of the Patient is more or leſs irritable. If theſe ſymptoms are leſſened by degrees without leaving a hardneſs in any glandular part, it is certain, that the diſorder will not degenerate into a ſcirrhus. But if theſe ſymptoms ceaſe ſuddenly, the epidermis is raiſed into bliſters full of ichor, or ſinks, and the colour of the part becomes black, or livid, whilſt the pulſe at the ſame time is but ſmall, the urine and excrements become fetid, and the ſenſibility of the affected part is intirely aboliſhed, it is moſt certain, that a gangrene is approaching or already begun. When a glandular part, after the ſymptoms are leſſened by degrees, becomes hard and reſiſting to the fingers, a future ſcirrhus is to be foretold. The phlegmons which take place in the eyes, throat, tendinous, or nervous parts, are to be accounted dangerous. The deeper the phlegmon penetrates into the affected part, the harder it is to be cured.

SECT. V.

Of the CURE *of* INFLAMMATIONS *in* GENERAL.

THE indication of cure for this diſorder, directs the uſe of all ſuch means as may tend to leſſen the erethiſm of the veſſels, and to abate the encreaſed velocity of the fluids. Theſe are both leſſened, or ſometimes totally cured by veneſection, mild purges, diluents, acids, oily, mucilaginous, and narcotic medicines prudently adminiſtered.

1. The diet ſhould be diluent, lenitive, and cooling. Blood ſhould be drawn in proportion to the fluxion, the intenſity of the pain and other ſymptoms, and according to the ſtrength of the Patient; large draughts of barley water, rice water, with nitre from ℈j to ʒj to every pint, alſo maiden-hair tea, whey and other liquors of the ſame claſs, are very efficacious.

The emulſio communis of the London pharmacopœia is excellent upon theſe occaſions; but it will become more agreeable, if inſtead of gum arabic, you ſubſtitute the four great cold ſeeds of each ʒj.

If the emulſion ſhould weaken the ſtomach, you may in its ſtead uſe barley water, aromatized with ſome agreeable herb, and ſweetened with the ſyrup of maiden-hair.

If the emulſion does not paſs off freely by urine, a proper doſe of nitre may be added to it occaſionally; for as no ſalt diffuſes itſelf in any fluid ſo much as nitre, it muſt be very efficacious, by exciting gently the contractions of the veſſels, to prevent the concretions of the animal fluids, in an inflammatory ſtate; but it muſt be taken with a ſufficient quantity of drink; otherwiſe it may irritate the viſcera, and particularly the kidnies and urinary ducts. Moſt commonly it carries its action upon the latter, and when it does, we may generally expect good effects from its operation; but in the diſorders of theſe parts, we are to be cautious, leaſt it ſhould irritate too much; it ſhould therefore be given in ſmall doſes, in theſe caſes, eſpecially by young Practitioners, who have not ſkill or experience enough to form a judgment concerning the ſenſibility of the Patient.

We may be aſſured, that nitre irritates, if, when it is adminiſtered in proper doſes, the quantity of urine compared with that of the drink, is too ſmall.

2. After bleeding in the foot, or in the jugular vein, and adminiſtering a gentle purge to clear the primæ viæ, a ſemicupium of warm water will ſometimes eaſe inflammations of the head; for by the heat of ſuch a bath, a great quantity of humour is derived from it to the inferior extremities, by which means their column and quantity is leſſened in the veſſels of the brain, and of conſequence their irritation and erethiſm. A ſmall inflammation of the brain is thus very often cured. A warm bath is no leſs efficacious

in curing inflammations in other parts of the body. For the fibres grow hard in this diſorder, it is no wonder, therefore, they ſhould ſoften with warm water, when the very horns of Deers may be rendered as ſoft as jelly, by being expoſed to its vapours. A vapour bath, and fomentations produce the like effect, eſpecially when they are more or leſs impregnated with emollients and aromatics, or with acids. Fomentations of warm milk may be ordered for the ſame end, with great ſucceſs, or a decoction of the root of althea, applied warm. A poultice made of ground linſeed, or a fomentation made of its decoction will anſwer the ſame end.

After employing baths, vapours, or fomentations, the following topics may be uſed.

3. Ointments, ſweet oils, liniments, anodyne pulteſſes, made up with bread and milk, the oil of olives, linſeed oil, and ſaffron, or diaſcordium, applied outwardly will contribute to leſſen the erethiſm, not only of the external parts, but alſo of the internal viſcera of the abdomen, and of the thorax. The ointments of althea and elder, the oil of olives, either jointly or ſeparately, in equal quantities, may be applied to the ſide; for example, in a pleuriſy. The following fomentation may be applied in the ſame caſe. Take four ounces of the tops of white poppies, boil them in two quarts of common water, until they are reduced to one, ſtrain, and add two ounces of vinegar; make a fomentation to be applied to the affected part.

4. In an erethiſm of the throat, oily potions, with ſome gentle narcotics, may be given with ſucceſs.

Inflammations of all parts of the body are cured after the ſame manner, but we ſhould have regard to the ſtructure, ſituation, and connection of theſe parts, to the antecedent cauſes of that diſorder, and to the conſtitution of the Patient.

It is certain, that the fibres grow hard by the force of the erethiſm, and by that means loſe their flexibility; therefore, to bring them to their former ſtate, it is neceſſary to uſe a great quantity of oil, eſpecially in the inflammations of the primæ viæ; but regard muſt be had to the ſtrength of the ſtomach and conſtitution of the Patient; for they are not to be given to ſuch as are of delicate habits, without ſome precaution,

caution, and if they do take any oily medicine, it ſhould be mixed with ſome agreeable aromatic or ſtomachic diſtilled water. Diſpenſatories abound ſo much with receipts of this kind, that it is needleſs to inſert any here.

As it is neceſſary to keep the body open, the decoction of tamarinds or prunes, lenitive electuary, ſalts and manna, &c. &c. ſhould be given or adminiſtered either in a draught, or in the form of a glyſter.

The primæ viæ being thus cleared of all ſordes, by the foregoing medicines, abſorbent draughts, ſuch as the decoctum album, or julap cretæ of the London Diſpenſatory, are to be preſcribed in the inflammations of the inteſtines, as often as they proceed from any vellicating acrimonious leven; and if the Patient finds eaſe by them, he is to uſe them plentifully, and afterwards to take a gentle purge. In the ſame caſe glyſters are very efficacious.

GLYSTERS are of great ſervice in inflammations of all parts of the body, becauſe they derive a great quantity of humours to the inteſtines, and becauſe they paſs immediately into the veſſels without weakening or fatiguing the ſtomach.

NOURISHING glyſters are to be injected, when the functions of the organs of deglutition are diſordered, or weakened, or when, on account of a violent vomiting, the aliments are rejected by the ſtomach. Often have I ſeen life ſupported a long time by this means.

5. IF by too rapid a motion excited by an inflammation, the hu-

mours are ſo much rarefied, that they occaſion a falſe plethora, we muſt have recourſe to acids. No Phyſician doubts, but volatile alkalies, by the force of inflammations are produced in the human body, and as a ſulphureous principle makes no ſmall part of the compoſition, they powerfully diſſolve the blood.

We are taught by chymiſtry, that acids have a great affinity with volatile alkalies, whoſe ſmell is owing to their combination with ſulphur ; hence it is probable, that acids taken inwardly, by uniting with the volatile alkalies, (which by the force of the diſorder, may be extricated from the maſs of blood) blunt their ſtimulus, leſſen the erethiſm, and prevent the diſſolution of the humours.

From hence, and from the anſwer given to the fifth objection, β. 4.

chap. 2. it is probable, that the particles of the fluids are attracted to one another, by the help of acids, and that their action againſt the ſides of the veſſels muſt neceſſarily be leſſened by theſe means. Beſides acids powerfully diſſolve the particles of tartar, which ſometimes get into the maſs of blood. From all which it is eaſy to judge why acids are ſo efficacious in the cure of inflammations.

6. If the greatneſs of the pain hinders the Patient to ſleep, he is to be ordered ſome preparation of opium, and after bleeding, diluting and evacuating the ſaburra of the primæ viæ, with a gentle purge prepared with manna, tamarinds, and ſome neutral ſalt. It is certain, that the impreſſion made by narcotics, in the parts which they immediately touch, ſoon abates the ſenſation of pain wherever it takes place, and this

muſt be owing to the ſympathy which ſubſiſts between the different parts of the human body, and not to the immediate application of theſe medicines, a truth I have ſeen verified in many inſtances.

Narcotics taken in the mouth, or in glyſters, ſoon ſtop or abate pain in any part of the body, as every one of the Faculty muſt have experienced. It is impoſſible that could be effected in ſo ſhort a time, by an immediate contact; therefore the impreſſion made by them in the ſtomach or inteſtines, is ſuch, that it is ſoon communicated to the whole nervous ſyſtem; whether that impreſſion is pleaſing or irritating, we are quite at a loſs. If a young tame, well fed Quadrupede is gently ſtroked in any nervous part by a Perſon with whom he is familiar, he ſtops, and is put into ſuch an extaſy, that he throws himſelf ſometimes on the ground, and, if the ſtroking is continued, falls a ſleep, of which I have myſelf ſeen many proofs made in animals of different kinds. It is ſurpriſing how variouſly the nerves are affected, not only by inward and outward applications, but by different ſounds. Muſic touches the ears of moſt People very agreeably, and the young more than the old ; as we may obſerve in Children, in whoſe tender nerves ſuch a pleaſing motion is excited by the ſongs or humming of their Nurſes, that they generally fall aſleep ; the bag-pipes have the effect of a diuretic on ſome People, according to the teſtimony of Dr. Whytt, in his treatiſe on animal motion. Good news moves the nerves of ſome individuals ſo pleaſantly, that they die in an extaſy of bliſs, and the death occaſioned by too great a doſe of narcotics is equally pleaſant.

But we cannot infer from theſe ſimilar effects, that the pleaſant ſleep procured by narcotics is owing to a pleaſing impreſſion.

I have proved by a great number of experiments, that pain in People of all ages, can be ſtopped by an immediate application of narcotics to the affected part. Is it not, therefore, beyond all doubt, that an impreſſion made by theſe medicines in any part of the body, is communicated to the whole nervous ſyſtem ?

Although narcotics ſeldom fail to abate pain in robuſt habits, they ſhould not be adminiſtered to weak and delicate People, without a great deal of prudence and precaution; eſpecially if they are not accuſtomed to take ſuch medicines ; for according to the proverb, *natura conſuetis gaudet*, cuſtom becomes a ſecond nature. It is thus the Turks accuſtomed to take opium from their infancy, uſe it inſtead of ſpirituous liquors, to get drunk before they go to battle.

About the laſt ſtage of an inflammatory diſorder, the theriaca of Andromachi, may be given from ℈j to ʒj. when the Patient is reſtleſs, eſpecially if the ſkin begins to grow moiſt. But if it it be neceſſary to ſollicit the oſcillations of the veſſels, Dr. Huxham's eſſence of antimony, may be given from 6 to 30 or 60 drops, in a glaſs of wine, or in a diſh of tea. If a gentle tonic medicine is wanting, the ſaline mixture of Riverius, with an addition of a little cinnamon, or nutmeg water may anſwer that end.

By the help of theſe medicines, and others, taken occaſionally from the claſs of ſtomachics and cordials, we can rouſe up the decaying ſtrength of the Patient, diſperſe beginning obſtructions, and prevent their future growth.

By the application of baths, vapours, liniments, and ſuch like topics, as we recommended above, it may happen, that an erethiſm may be intirely cured, and the preternatural velocity of the fluids leſſened, and brought to its due degree of uniformity in the affected part. The humours which were propelled by the force of the erethiſm into the cellular membrane, find by theſe means, a free paſſage to run back by the inſpiring veſſels into the maſs of blood, or to exhale through the expiring veſſels by the pores of the ſkin; and though the erethiſm of theſe parts may not be overcome by topics, as it happens very often, eſpecially when proper internal medicines are not ordered at the ſame time, and when the ſtrength of the Patient is too great, we have ſtill this advantage, that the texture of the ſkin is ſo much ſoftened by the uſe of topics, that the extravaſated fluids can eaſily paſs out thro' its pores.

By a ſkillful and timely application of medicines, not only an infinite number of abſceſſes, but loſs of limbs, and fatal ulcers may be prevented, and it is only by a perfect knowledge of phyſic, we can be directed how to act in ſuch caſes.

Any impartial judge muſt own, that the remedies preſcribed in this ſection, directly anſwer the indications which I have drawn from the eſſence or prime attributes of an inflammation.

BUT ſhould any one take the indications of an inflammation, for example, from the proximate cauſes to which it is attributed by Boerhaave and Van Swieten, in aph. 371. he might try many uſeleſs experiments, and do the Patient more harm than good. This will appear more clearly in the following chapter.

CHAP. II.

Which proves the curative indications of an inflammation to be repugnant to Boerhaave's *doctrine, aph.* 371.

ACCORDING to our Author, an inflammation proceeds from a ſtagnation or ſizineſs of the blood, ſerum or lymph in the capillary veſſels. If it did, the medicines which are properly called aperients, and attenuants; ſaſſafras, for example, lignum guaiaci, and ſuch drugs as encreaſe the blood's motion, would be very efficacious in the cure of this diſeaſe, even in its increaſe and vigour. On the contrary, acids by coagulating the blood, and leſſening its motion, would be hurtful, and emollients would be no leſs prejudicial, becauſe the capillary veſſels in that hypotheſis, would be ſo much diſtended by the accumulated fluids, as to be in a proximate ſtate to a rupture, which would ſoon be compleated by the ſoftening quality of ſuch medicines; but the contrary evidently happens in practice; for emollients and acids are preſcribed with ſucceſs, to diminiſh the ſtricture and erethiſm of the veſſels in an inflammation; for which reaſon, it may be juſtly concluded, that Boerhaave's doctrine is contrary to the curative indications of that diſorder.

β. 4. SOME unexperienced Gentlemen, who conſider the materia medica by the lump, and have no certain rule to guide them therein, may object, that attenuants and aperients, are really efficacious in inflammations.

I OWN, that aperients and attenuants are ſometimes uſeful towards the laſt ſtage of the diſorder, and that by a proper application of them at that time, obſtructions and ſcirrhi are very often prevented; but, I deny that they can be uſeful in the vigour and encreaſe of this diſeaſe, for by irritating the ſolids with the hard particles upon which their virtue depends, and by which they procure heat, they would entertain and encreaſe the erethiſm of the veſſels.

ß. 5. MANY will object, that vegetable acids, far from coagulating the blood, diſſolve it.

ALL Phyſicians agree, that acids are cooling, but they cannot cool a living body, without diminiſhing the action and re-action of the ſolids and fluids; therefore a lentor muſt neceſſarily follow an immoderate uſe of acids, whether taken as aliments or as medicines. For the blood muſt contain the principles of our food, according to the axiom, *principiata redolent naturam principiorum*, and the chyle, by heat as well as by want of motion, grows acid; beſides it affords a great quantity of it by a chymical analyſis. But acids in general have a property of coagulating; therefore it can be aſſerted, that the chyle and blood reſulting from a lentor occaſioned by an immoderate quantity of acid aliments, are apt to coagulate and form concretions. Every one may with me have obſerved, that thoſe who make an immoderate uſe of farinacious food or aceſcent vegetables, as rice, oat meal, peas, beans, &c. in pap, or lemons, oranges, limes, with all other kinds of fruit, look pale, have bad digeſtion, are ſubject to obſtructions, bilious ſevers, and other diſorders of the liver, which are removed chiefly by the uſe of alkalies, purges and abſorbents. The truth of what is here advanced, will be allowed and confirmed by any one of the Faculty who has been in Jamaica, or in the other ſouthern iſlands of America, where the inhabitants, by uſing too much fruit or an aceſcent diet, are univerſally ſubject to the diſorders which proceed from a ſuperabundance of bile.

WHAT I have ſaid concerning vegetable acids, is contrary to Van Swieten's commentary on aph. 117. of Boerhaave. Indeed, what is there affirmed by this celebrated Author, is not conformable to experience, for he puts wine, vinegar, milk, and fruits of all kinds in the ſame claſs, and ſays, that they all diſſolve the blood very powerfully. I am perſuaded,

ſuaded, that this miſtake is to be attributed rather to a ſlip of the pen, or a fault of the Printer, than to our Author. For it is well known, that very few Phyſicians in Europe excel him in his knowledge of the *materia medica*.

I ALLOW that fruit and vegetable acids are very efficacious to leſſen the ſtimulus of the blood, and that by an immoderate uſe of them, it may be taken away intirely; but in a ſhort time they generally engender in its place a more hurtful ſtimulus; for when they are uſed as aliments for too long a time, they ſupply a bad aceſcent chyle, which may paſs in the meſeraic veins to the liver, in ſo great a quantity, as to thicken the bile, take away its activity, and render it partly or altogether unfit to diſſolve and combine the different elements of the chymus; from whence proceeds bad digeſtion, bad chyle, bad blood, and a lentor, which bring on obſtructions, concretions, irritations and colics, with the other evils which ariſe from ſuch complications.

IT may not be foreign to our ſubject, to obſerve in this place, that acids are recommended by Galen to cure the ſcirrhi of the viſcera, but he ordered them to be mixed with aromatics or with bitters; but what reſults from ſuch a mixture, is intirely different from vinegar, for example, or any other acid, and for that reaſon, poſſeſſes different properties, and produce different effects. Many Phyſicians give vinegar plentifully as an attenuant in all obſtructions, and in a moiſt or dry aſthma. I allow that vinegar acts ſometimes as an attenuant, but it does not follow from thence, that it ſhould be ranked in the claſs of attenuants, for ſuch an arrangement would produce a confuſion in the materia medica, which would be very prejudicial in the practice of phyſic. Calcined hartſhorn and rice are very efficacious in a diarrhœa; but ſurely no Phyſician will ſay, that they are aſtringent, yet we know, that ſome empirics give them that name, and they retain it eternally in families, where ſuch People have credit, and theſe families would account the moſt learned Phyſicians very ignorant, if they ſhould preſcribe them in any other illneſs, but a diarrhœa; for relying intirely upon the affected gravity and authority of theſe favourite pretenders, it is impoſſible to perſuade them, but that the aſtringent effects of theſe ingredients, are owing to their eſſence or nature, and not to any accidents.

THE ſame thing may be ſaid of acids in general, and of vinegar in particular, which only becomes an attenuant by its effects, in aſthmas and obſtructions, though it has not that property eſſentially. We are to remark, that real attenuants would be very noxious in circumſtances, where vinegar is uſeful, and that it is by the rules of phyſic, only we can know this difference.

NOTHING helps us more to make a happy progreſs in the practice of phyſic, than a due diſtribution of medicines into proper claſſes, and all the abuſes which are committed in the materia medica, proceed chiefly from want of that arrangement. Have we not therefore, reaſon to fear, that vegetable acids, lemon juice, vinegar, fruit, &c. ranged by Van Swieten, in the claſs of attenuants, may lead young beginners into innumerable errors? Are not the evils which ariſe from thence the more to be feared, as the authority of that celebrated Author prevails ſo much all over the univerſe, that whatever Phyſician will dare to contradict it, muſt endanger his reputation?

MANY Empirics, and even ſome Phyſicians to this day, boaſt of the great ſucceſs they have had in adminiſtering internally preparations of gold, ſilver, copper, and lead. Such errors probably derive their origin from ſome celebrated Phyſicians, who preſcribed them, perhaps, for the ſake of trial, before phyſic was ſo well cultivated as in our days.

SOME uſe preparations of lead very frequently in gonorrhœas, and believe them to be ſpecific, though nothing more certainly deſtroys the ſtomach or inteſtines, than that metal, of which forty Perſons, who died by drinking ſmall wine, wherein litharge was infuſed, afforded me a fatal proof.

THE deſign of theſe remarks, is to ſhew that the careleſs ſlips or inſinuations of great Phyſicians, are very dangerous, eſpecially with regard to acids and aceſcent aliments, as may be obſerved by the great number of Negroes, which our Merchants and Planters loſe by a mealy aceſſent diet; for they are ſeldom allowed any thing but rice in the paſſage from Africa to America, which by turning ſour on their ſtomachs, produces all the bad effects of acidity, and very probably renders their perſpiration too ſlow, and it is from thence, perhaps, and from their other concuring circumſtances, that they have ſuch a diſagreeable ſmell; for the humour which paſſes off by ſweat, and inſenſible perſpiration, are of the ſame nature with the urine, ſo that when they are retained, they may acquire a bad ſmell in the ſame manner as the urine, as I ſhall explain, when I come to treat of obſtructions.

RAMAZINI remarks, that cleanſers of jakes are ſubject to inflammations of the eyes*, and in ſome countries abroad, (I will not name) where inſtead of jakes, pots are kept in the bed rooms, the People are very much ſubject to opthalmies, and ſuch of them as I adviſed to keep out of the way from bad ſmell, ſoon got rid of their diſorder.

FROM hence it is certain, that the acrid effluvia, which offend the noſe, are alſo offenſive to the eyes, and that the fetid particles which exhale from the bodies of the Negroes, render them ſo much ſubject to opthalmies in their paſſage from Africa to America. The poor wretches are bled ſo copiouſly on theſe occaſions, that the circulation is weakened, and the diſorder encreaſed, until it carries them off.

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* See his Treatiſe on the Diſorders of Artificers, chap. 14, tranſlated into Engliſh by Dr. James.

WE are to remark, that the blood reſulting from aceſcent aliments, eſpecially in theſe People, who grieve without doubt, on account of their confinement, muſt be poor and contain but little ſpirit, and that of conſequence, they cannot bear to loſe much of it; for which reaſon, they ſhould not be bled without due precautions, but ſhould be treated according to the method preſcribed by Ramazini, and the diſorder ſhould be prevented by allowing them better food, and keeping the place where they lie very clean and as free as poſſible from bad ſmell.

I WAS informed by ſeveral Portugueſe Captains who uſe the African trade, that they feed the Negroes the ſame way as the Sailors, and give them ſometimes a little wine, and that they ſeldom loſe many of them in paſſing from Africa to their colonies.

I MAY venture to ſay, that whoever has recommended rice as a continual diet among our Negroes, has been acceſſary to the death of ſo great a number of them, as to be a great hindrance to the cultivation of our colonies, and cauſe our Merchants and Planters to loſe many thouſand pounds ſterling, per annum.

I DO not mean to forbid intirely the uſe of rice, and other mealy ſubſtances; on the contrary, I allow, that in hot climates, it may be neceſſary for all degrees of People to take ſuch food now and then, in order to check perſpiration, and retard the excretion of the liquid part of the aliments. But when a cuſtom prevails with regard to food as well as dreſs, it is very hard to remove it; and, perhaps, our Merchants and Planters, will never change their method of feeding the Negroes, even when they are informed by what is here advanced, that it is much againſt their intereſt to continue it.

MOST of our cotempories content themſelves with the thoughts, manners, and examples of their predeceſſors, without examining whether they be good or bad; becauſe ſuch an enquiry would coſt ſome pains and labour, and very few are fond of interrupting their pleaſures upon ſuch an occaſion.

As my aſſertion, concerning the increaſe of the bile, from an immoderate uſe of aceſcent vegetables, is a new opinion, it may be objected to, by thoſe, who with Dr. Haller, maintain, that as the bile has the property of ſoap, it muſt be always compoſed of proportionable quantities of oil and alkali, which can only give it that property according to their ſuppoſition.

THE invalidity of this objection, may be eaſily inferred from what I have already advanced on this ſubject, and as ſoap can be made with oil and acid, as well as with alkali, the ſoapy property of the bile can afford no ground for an objection againſt me.

CHAP. III.

Of the Reſolution or Diſperſion of an Inflammation.

THE reſolution of an inflammatory ſwelling, does not happen until the diſorder is upon the decline. Fernelius ſays nothing in particular about it, Boerhaave explains it in the following aphoriſm.

" 386. Si humor fluens blandus, motus ejus ſedatus, cauſa obſtruens non nimis ſolidata, obſtructio, parva eaque imprimis in arteriis vel in initiis lymphaticorum, canales mobiles, diluens vehiculum, reducto fluore concreti, motu ſtagnantis, ſolvitur inflammatio reſolvendo."

BOERHAAVE ſuppoſes in this aphoriſm, that all inflammations proceed from an obſtructing matter, concreted by ſtagnation ; but would it not ſeem very abſurd to aſſert, that the inflammation which happens the inſtant that the tendon of the muſcle biceps is pricked by a lancet, ſhould proceed from ſuch a cauſe ? Can ſtagnation happen ſo ſuddenly ? And if it could, how is it poſſible that the ſtagnating fluid could be concreted in an inſtant ? It is certain, that the humour collected in the cellular membrane during the inflammation, may be concreted by the heat which attends this diſorder ; for we may ſee hard cruſts remain under the epidermis, after ſome ſuperficial inflammations, and the ſame may happen internally ; for as nature contrived the epidermis to ſurround the whole ſuperficies of the body, ſo ſhe has been no leſs kind in ſupplying every veſſel and every muſcular fibre, with a particular membrane, under which may lodge the matter concreted by an inflammation, the ſame way as under the epidermis. But no Phyſician or Surgeon will ſay, that the cruſts which remain under the epidermis after an inflammation, were the cauſe of that diſorder; therefore, there can be no reaſon why the like concretions ſhould be the cauſe of inflammations in the internal parts of the body; for the example I have mentioned, evidently proves, that they are its effects, and not its cauſe.

HENCE it is demonſtrated without the help of any ſyſtem or hypotheſis, that the humours attracted to an inflamed part by the force of an erethiſm, can paſs into the cellular membrane, as well as to the epidermis, without the rupture of any veſſels. See

See page 58. In treating of obſtructions, I will enlarge more on this ſubject.

IN the laſt ſtage of an inflammation, the erethiſm of the veſſels, with the velocity of the fluids, diminiſh gradually, until the motion of the humours becomes ſo ſedate and uniform, that the matter of inſenſible perſpiration can run out through the pores of the ſkin as free as in a ſtate of health; but it cannot paſs out that way, without meeting the matter, which during the inflammation, was inſpiſſated and collected in the cellular membrane, without mixing therewith, and rendering it more fluid. As the humour of inſenſible perſpiration goes off in a warm vapour, it ſhould diſſolve concretions very efficaciouſly. When the morbific humour is attenuated by this vapour, it ſhould go where it finds leſs reſiſtance, and either return into the maſs of blood by the inſpiring veſſels, called abſorbents, or paſs out by the expiring veſſels through the pores of the ſkin.

WE are to obſerve, that ſeldom any part of this fluid returns into the maſs of blood, for the pulſation of the veſſels, and the direction of the humour which goes off by inſenſible perſpiration, determine it to paſs out through the ſkin. But as this cannot happen, until the erethiſm, and the preternatural velocity of the fluids ceaſe, it may be eaſily underſtood, that an inflammation can never be terminated in the cellular membrane. For an inflammation never ceaſes on account of a preceding reſolution; but a reſolution of the morbific matter comes on, becauſe the inflammation ceaſes; therefore, our Author has no reaſon to aſſert, that an inflammation terminates by a preceding reſolution.

It follows from what is ſaid in this ſection, that the reſolution of an inflammation does not happen after a ſuppuration, but when without any ſuppuration, the diſorder ceaſes.

We have nothing to do with the firſt part of this objection, becauſe it attacks the principles of Boerhaave, who contrary to our opinion, aſſerts, that an inflammation terminates by ſuppuration, but if after ſuppuration the inflammation does not ceaſe, there can be no reſolution. We know that ſuppurated tumours are often removed by a ſalutary metaſtaſis. As to the ſecond part of the objection, we acknowledge, that an inflammation goes off without any ſuppuration, when nature overcomes the diſorder.

SIGNS *of* RESOLUTION.

WHEN an inflammatory ſwelling is but ſmall, without any fluctuation of matter, and the reſt of the effects are not very intenſe, but vaniſh by degrees, it is certain, that it will paſs off by reſolution or diſperſion.

THE reſolution of an inflammation may be procured by the remedies I have recommended, in ſect. 5. chap. 1.

FINIS.

ERRATA.

Page 1.	Line 11.	*for* Fernellius, *read* Fernelius,
5.	5.	after eryſipelatodes, *read* ſchirrodes & oedematodes.
79.	2.	after and, *read* Van Swieten.
90.	18.	after ardent, *read* fever.
96.	15.	for ſympathy, *read* force.
135.	17.	after julap, *read* e.
138.	16.	after opium, *dele* and.